Advanced MANAGEMENT

VOLUME 22 NO. 8

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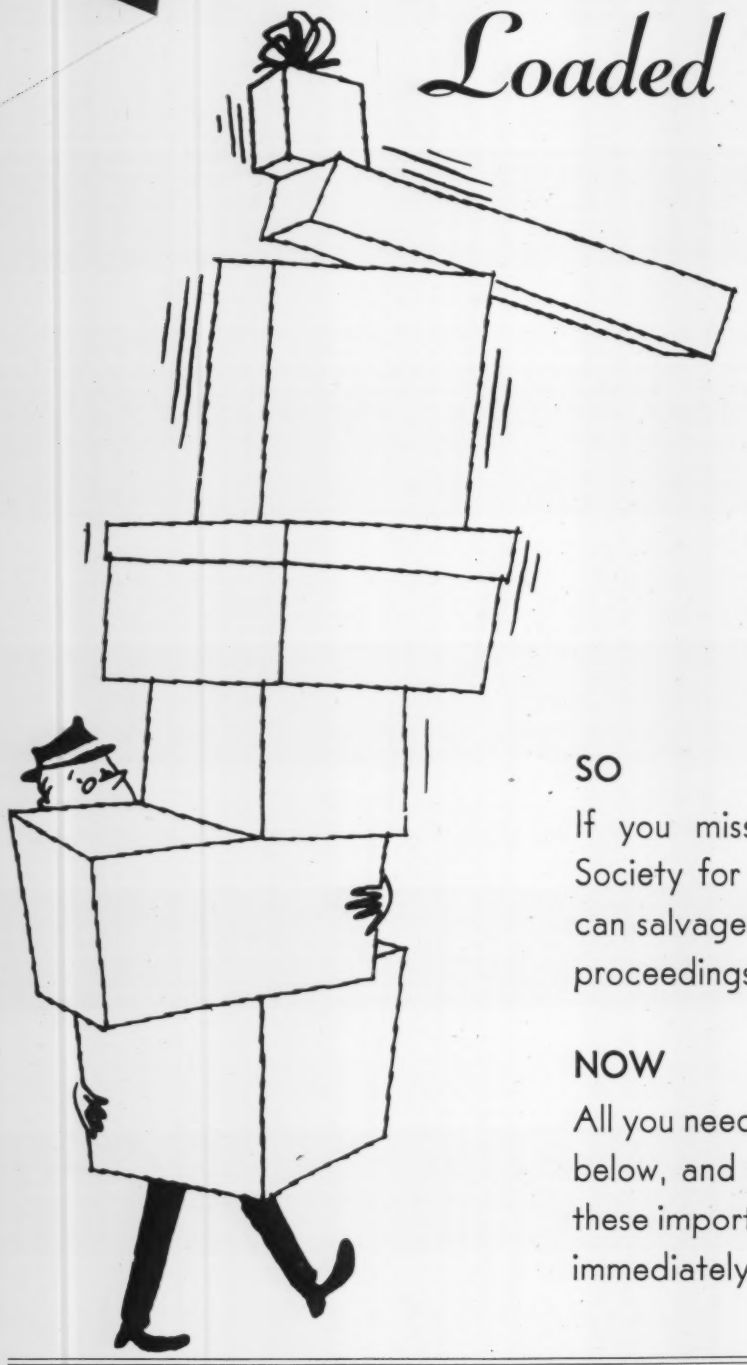

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S.A.M. Constitution

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Scientific Management

THE TERM "scientific management" is frequently misunderstood to mean the application of scientific knowledge to the problems of management. With such a definition, we can readily conclude that the practice of scientific management should, therefore, be largely limited to those having higher level scientific training. A more fruitful and practical meaning is to regard scientific management as being the application of the scientific *method* to the processes of management.

The classic steps in the scientific method are readily understandable and can be applied to the solution of managerial problems. These are (1) Hypothesis, (2) Experiment, and (3) Test of Hypothesis. In the first step, the basic postulates are made or provisionally adopted in order to explain certain facts and to guide in the investigation of others. After the experiment has taken place, an analysis and evaluation of what actually occurred must be made in order to test or prove the original hypothesis. It is in the third step that the scientist learns what was right and wrong with his original assumptions. He can then make necessary changes so that progress will be made toward a workable solution of this problem. As we know, this analysis and evaluation of what actually occurred is often a most difficult task. Considerable emphasis is placed, in the training of the scientist, to teach the individual to base his conclusions on complete objective analysis and not upon personal opinion or subjective reasoning.

In management, the basic function of Planning can be regarded as step (1) in the administrative process. Step (2), then, is the execution of the Plan, and step (3) the appraisal or evaluation of what took place. In this process again it is step (3) which should, but not always does, receive more careful attention. The training of the manager to more thoroughly and objectively appraise the strengths and weaknesses of his original planning and take this knowledge into consideration in subsequent planning is of vital importance. It is only through objective analysis of what actually happened that the manager can avoid repeating errors and learn how to solve his problems more effectively.

Most managerial problems today are recognized as being in the area of human relations. They are problems arising out of the desire to make more effective use of human resources. The ability to plan and execute—to get things done effectively through others—is largely based upon the ability to appraise the effects of managerial decisions thoroughly and objectively and profit by the experience. It is in the area of human relations that we are most prone to jump to conclusions—to be unscientific in analyzing and evaluating what took place.

The challenge to scientific management today lies not so much in improvement in the mechanical aspects of the administrative process as in improvement in the personal relations aspects—that part of management which involves effective utilization of human resources. In my opinion, more rapid progress will be made in this area when we learn how to apply scientific method better for the purpose of bringing about improvement in the factors which favorably influence employee motivation and morale.

H. E. Lunken
S.A.M. National President

H. THOMAS HALLOWELL Jr., has been with Standard Pressed Steel since graduating from Swathmore. He was made a superintendent in 1930, plant manager in 1943, vice president and general manager in 1948 and became president in 1951. Under Mr. Hallowell's direction SPS has expanded to become one of the giants of the fastener industry. Mr. Hallowell was chosen by the S.A.M. Philadelphia Chapter to receive its 2nd annual Management Award in 1956.

Reducing Costs Through Purchasing

by H. Thomas Hallowell, Jr.
President
American Standards Association
and
Standard Pressed Steel Company
Jenkintown, Pennsylvania

THERE now exists so many more ways to do any given job that we tend to become confused as to what is old and tried in contrast to the new and unproven. Of course, the only right way to progress is to use the very best course available, which consists of the best of the old ideas and the best of the new ideas.

With things changing so fast, due to the multiplying effect of new and changing ideas and so many new people in our management jobs—brought about by the rapid expansion of our economy—it is quite easy to be diverted by the glamour, "hoopla" and advertisements of "pie in the sky" promised by the would-be creators of tomorrow's necessities.

Let us not discourage this dynamic atmosphere, but let's go to work to bring the pie in the sky down to earth so that we can enjoy it as pie on the table. And, of course, let us do this in such a way that we can afford it and bring it about profitably so all can benefit.

We do know, and we should instinctively know by this time, that we have had continuing long-term world-wide inflation, and it will probably continue on a controlled basis or semi-controlled basis.

And by this time we should know that using capital is a lot cheaper than using people's efforts and by using larger doses of capital in new plants with modern methods and the latest machines, with enlightened management and cooperative workers, we can make possible low costs brought about by large-scale standardized production and in this way we can combat inflation.

The output of our modern industrial progress produces goods faster in terms of human effort than hourly wages rise. From this phenomenon we get our increasingly higher living standards.

I said, "large-scale production of a standardized product." And to bring about this large-scale production we need a product that can be used by more than one person or organization and will have as wide-spread a use as possible.

Where there has been large-scale production of standardized products and we've used plenty of capital in latest plant, tools and equipment, we've been pretty well able to keep costs down and prices under control.

To illustrate that an enlightened management can do this job, in our own company on our standard products—Unbrako socket screws, Flexloc locknuts, Hallowell work benches, Cleveland cap screws, Cooper Precision Products items and our other standard lines—the overall prices have gone up less than 30 per cent since 1940, while wages have gone up over 135 per cent; steel prices up about 85 per cent and freight rates up approximately 45 per cent in the same period!

However, by the same rules with the same economics at work, today on non-standard items or a way of filling requirements by custom-built methods, costs and prices are many times higher than 20 years ago!

Capital assets are not high production items and tend to be made by custom methods, therefore, the cost of capital assets have probably gone up several times whereas production items have gone up only a few percents. And chances are the capital items—machines buildings, tools, etc.—will continue to rise greatly in the future.

Small lots of special items are not produced economically by any supplier when honestly compared to the situation costwise and pricewise with the closest standard substitute.

Furthermore, an informed supplier prices his standard items at such a low price as to not bring undue competition into the field, and today in progressive companies, costs and prices and profits on standard items are kept separated from the same elements of our non-standard items' production—and there is good reason for this.

The throwing of a volume of good, standard peaches into the same basket with a few non-standard lemons can make such a formidable brew that its

effects can be extremely corrosive to a company's profits. For example:

$1000.	Sale of standard high production stock items (peaches)
900.	Costs
$ 100.	Profits
$ 150.	Cost of a non-standard short lot special (lemons)
50.	Sales price
$ 100.	Loss

On a combined sale of $1,050. of standard peaches and non-standard lemons, the profit can be 00000! However, if we eliminate the lemon, the profit goes back to 10 percent—or by increasing the price of the lemon even 3 times, the profit on the entire transaction would be 9-½ percent! (Just breaking even on the special!)

EVEN with a constant campaign on converting special users to standards, we do a very large volume of special item business. A whole division of our company is set up to handle these variations from standards in a most prompt and economical manner. We have taken every step to minimize the pain of a necessary special, both in our own organization and our customer's.

Now, Mr. Executive, these simple facts of industrial life today apply not only to your suppliers but you'll find even more graphic illustrations in your own manufacturing and company operations. How long can a situation such as this continue? As long as your profits and your management will allow!

Management is the planning, organizing, directing and controlling force in the use of capital and efforts in our American industrial set-up and management decisions require a dollar tag on them.

There is no one management group more enlightened and expert at getting the best prices on things bought in the market than our purchasing executives and their purchasing personnel. People both inside and outside your organization can be educated rather promptly through their pocketbooks!

To lower purchasing costs you, more than ever before, are the people who can put the price tag on the wastefulness of the non-standard requirements of specials required by your company.

Specials need special treatment all along the line. They must be screened and estimated. They require special engineering, expediting, processing, time-study, supervision, inspection, testing and packaging. They require special tools, gages, materials and set-ups on the machine tools. And they're usually produced by slower methods due to the low volume per order.

Fewer specials mean higher volume, longer runs, continuity of operations justifying more mechanization, special purpose machines and better tools.

I have found that there are four types of variations from standards:

Class 1:

A specially-engineered item that serves a very necessary, useful purpose, needed in large quantities, and by using it, improves the performance of the end assembly in such a way that its increased cost or nuisance value is more than offset by greatly improving the end performance of the products.

Class 2:

A specialty item required which perhaps could be eliminated or converted to a standard if sufficient time and thought were put on the problem, and whose extra cost can be economically justified by a slightly or marginal increased utility of the end product.

Class 3:

A specially-designed item which does not serve any very useful purpose, however, the extra cost is definitely not made up in increased utility of the end product.

Class 4:

The "god-awful" type of special whose costs are completely out of keeping with the economics of the assembled product and the elimination of such item can bring about savings many times greater than the cost of *engineering man years* if required to bring about the elimination.

Purchasing executives are in a position that it is necessary for them to have sufficient standing in an organization so that they have freedom to be uninhibited in helpful suggestions to the engineering department. Probably more than half of the special items (variations from a standard) could be eliminated if someone were to ask, "Is this really necessary?" If it were totally eliminated or converted to a standard article just how would it adversely affect the performance of the assembled product?" Let me encourage you to do this even more often than I think you've done in the past.

Just why does anyone need a special length of thread on a cap screw? We find that this is usually the result of some engineer's designing. He should have looked at a cap screw standards book! Why is a very long hollow set screw necessary? It's a special. It costs a great deal more than a standard. Why not screw two short hollow sets in the hole, one on top of the other? This approach can bring about untold savings.

The problem of organizational status is equally important in the engineering department as it is in the purchasing end of the business. Furthermore, engineering specifications bear a signature of some responsible person and so does the requisition for the material.

Standardization can proceed at a much more rapid rate for the benefits of all concerned if there is a company atmosphere reflecting top management thinking which makes possible an intelligent interchange of ideas in both directions between engineering, stores and purchasing, with the proper dollar tags attached so that the most economic way is achieved before the final decision is made.

PURCHASING is in a unique position because their job is to select their supplier. They can, therefore, do business with enlightened, progressive suppliers who have large research divisions in their organizations. And purchasing executives are in a position to be a most constructive guiding influence on the research programs of their suppliers, particularly when they represent the purchasing requirements of a large user of the supplier's products.

He can take advantage of these research facilities by first giving such a supplier a part of his business and secondly, by bringing the supplier's research men in contact with his own engineering and development men in such a way that there can be an interchange of ideas so that everyone learns.

In this way new products and components can be devised so that they will have the greatest chances of serving a useful need, and quite often a supplier-consumer relationship can develop a standard product which can have an industry-wide application.

Today a first-class supplier must be able to furnish complete data as to specifications and performance and satisfactory proof of testing on his product. By so doing he eliminates the necessity

D. S. Harder Honored With Award Presented During S.A.M. Material Handling Conference

Left to Right: Seated at the Speakers' Table during the banquet at which the Material Handling award was presented, are **E. D. Ditto,** Detroit Transmission Division, General Motors Corporation; **W. C. Allen,** Director Manufacturing Planning, Westinghouse Electric Corp., Pittsburgh; **J. Wellington Hall,** Manager Material Handling, Meter Division, Westinghouse Electric Corp., Newark, N. J.; **Roland W. Puder,** S.A.M. Vice President of Material Handling and Group Supervisor, Engineering Dept., E. I. du Pont de Nemours & Co., Wilmington, Del., **D. S. Harder,** Exec. Vice President, Basic Manufacturing Divisions, Ford Motor Co., Dearborn; **H. Howard Turner,** Chairman of the Board, Hambleton Company, Inc., Wilmington, Del.; **L. West Shea,** Secretary, Material Handling Institute, Pittsburgh, and **Harold R. Bixler,** S.A.M. Executive Vice President.

A HIGHLIGHT of the 1956 Annual S.A.M. Material Handling Conference, which took place in New York City on June 13-14, was the presentation of the S.A.M. Material Handling Award for 1956 to D. S. Harder, Executive Vice President of Basic Manufacturing Divisions for the Ford Motor Company. The presentation was made during the conference luncheon on June 13 by Roland W. Puder, of E. I. du Pont de Nemours & Company, chairman of the S.A.M. Conference Committee, and S.A.M. Vice President of Material Handling.

Mr. Harder, eminently qualified to forecast the future in Material Handling due to his many contributions in the field, made some interesting forecasts in his acceptance speech, following the presentation. One of the developments credited to Mr. Harder, and in part responsible for winning him the S.A.M. award, was his introduction of "automation" in pressed steel, engine work, and machinery operations—considered the major innovation of the past decade in automotive manufacturing. ■

Above: S.A.M. Vice President of Material Handling **Roland W. Puder (left)** presenting the 1956 S.A.M. Material Handling Award to **D. S. Harder. Below: H. Howard Turner** (standing) makes a point in discussion with **R. W. Puder** and **D. S. Harder,** during the conference.

for the user to do this checking in a field in which the user is not a specialist.

Titanium aircraft bolts which we currently produce in quantity are the outcome of a three year experimental program which cost us more than ½ million dollars. These bolts are 56 percent as heavy as their steel counterpart yet they have the same tensile and shear values as heat-treated alloy steel, and the fatigue characteristics are equal or better.

The control techniques on this item are so unusual that no customer at this time has adequate facilities to check the finished item. Therefore, our organization has taken on the added responsibility of furnishing all information required by the customer and we certify that the facts are correct on each individual item shipped. This procedure is being used on an increasing number of our new items.

Research and standardization practices in the Standard Pressed Steel Co. and its subsidiaries have allowed us to constantly improve our products and develop new ones so that today with ten plants in three countries and 5000 employees, we can manufacture and have in stock more than 500 million pieces.

Standardization makes it possible for approximately 75 percent of our total business volume of more than $50 million per year to be stocked by our distributors all over this country and in other parts of the world, so that immediate service can be furnished to any one of our tens of thousands of end consumers who have shown their confidence in our company by working with us so that together we both can prosper and continue to grow. Yes, these ideas work! Our company seems to be growing at the rate of doubling its size each five years.

A standard product means, Mr. Executive, that you need much less investment in inventory and still can have a prompt, adequate shipment.

One further step your leadership might accomplish in your own company is the education of top management as to the importance of standards in today's industrial economy. Too many chairmen, presidents and vice presidents still look upon standardization simply as a technical function of production. And top management usually delegates technical functions to the experts in charge of the various departments of the company. In a complex, inter-related economy like ours, this delegation can be overdone.

Standardization today is a true management function that should not be completely delegated to others because some of our greatest future areas of cost reduction with corresponding increases in profits lay in the area of the more development and use of American Standards.

THE CONCEPT and use of standards is a key element in management control, coordination, integration, planning and continued profits. Your purchasing executives have a most important responsibility to constantly drive for more standardization among your outside contacts and within your own company, your associates and higher management. Your continued efforts for maintaining standardization will result in reducing costs and increasing profits through purchasing. ■

ARTHUR P. O'CONNOR has been with the Lester Engineering Company since 1948, beginning as Senior Auditor and moving up through Assistant to Controller, in 1956. Mr. O'Connor graduated from Western Reserve as a Certified Public Accountant. He is a member of the Ohio Society of CPAs, American Institute of Accountants, and the National Association of Cash Accountants.

Mechanized Accounting For The Industrial Firm

by Arthur P. O'Connor
Assistant Controller
Lester Engineering Co.
Cleveland, Ohio

WHEN pen-and-ink bookkeeping methods are used, the most matter-of-fact functions seem to become "complex" as the volume of activity increases and new requirements are added. It is natural, then, to view the possibility of mechanization with a certain amount of caution, and to feel that the use of machine equipment might further complicate a perhaps already involved situation.

The truth is, though, that mechanized accounting *simplifies* routine bookkeeping procedures. How and why it does so will be the subject of this article.

At Lester Engineering Company, all standard bookkeeping is accomplished on one typewriter-bookkeeping machine. By observing several record-keeping applications of this equipment, we shall see how it tends to simplify the work, eliminate wasted effort and cut clerical costs. The records produced are accurate and up-to-date in a manner impossible to achieve under a manual system.

Look first, if you will, at Figure 1, which shows the machine method for the commonest bookkeeping job of all—accounts receivable. Observe that entries are made to the customer's statement, his individual ledger card and the sales journal at the same time. The amount of sale is distributed to one or more of five columns at the right, which automatically accumulate as entries are made. The machine then prints .00 in the extreme righthand column, indicating that the amount distributed was equal to the amount charged on the statement and ledger card. (If an error is made on any line of posting, the machine prints the amount of that error—instead of .00—and it is corrected immediately.)

Accounts receivable is possibly the

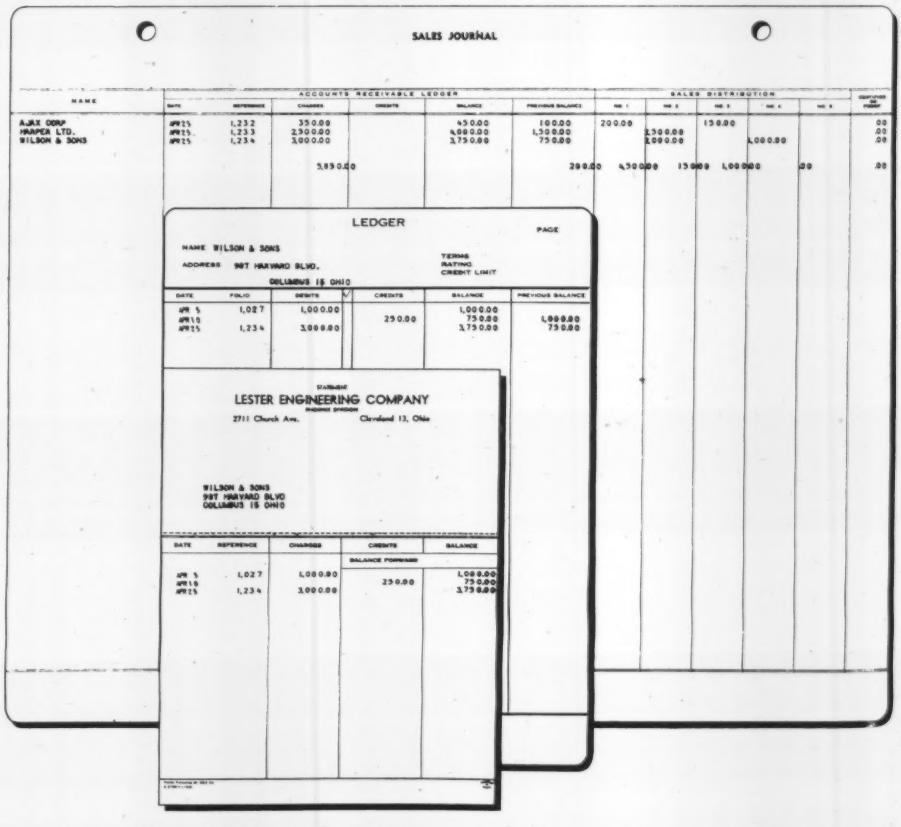

Figure 1. Accounts receivable set-up combines customer statement, ledger card and sales journal; note sales distribution to columns and ".00" proof of posting accuracy.

simplest of all bookkeeping jobs. Yet even this task would require about three of four separate operations—journalizing, posting ledger, analyzing sales and writing statements—under a pen-and-ink bookkeeping set-up. Further, all balances are automatically computed, journal columns are machine-added, and the work is proved, line by line.

The reverse side of this operation, cash receipts, is also simplified through mechanization. The journal is created as a by-product of entering credits to customers' ledgers, and again, each line is proved by machine.

The result is that the usual peak load and confusion at the end of the month have been eliminated. Work is kept in proof at *all* times, so we never have to worry about chasing down errors.

The Basic Idea

The basic idea of machine accounting is to *combine related tasks* and to make all computations mechanically.

This idea can be extended far beyond the mere "ledger, statement and journal" combination. As an illustration, let's take accounts payable. A manual system requires the following minimum operations:

1. Write voucher register, distribute to columns.
2. Prepare voucher.
3. Write remittance advice (or check stub).
4. Make some form of cash disbursements journal.
5. Write checks.
6. Add and prove voucher register columns.
7. Analyze and prove "miscellaneous" or general ledger column.
8. Post distribution totals to general ledger.

These are all separate steps, and of course every one of them involves mental or adding machine calculation, with an opportunity for error every time an entry is made.

A machine plan for this work is shown in Figure 2. Voucher, remittance advice, journal and distribution tickets are made at the same time—and proved. We have four major distribution accounts: materials, freight in, small tools, and shop supplies. On these, distribution is made directly to columns, and accumulated in separate machine totals. On all other accounts, distribution is made to tickets. In either case, proof that the amount distributed was equal to the amount vouchered is immediate and automatic.

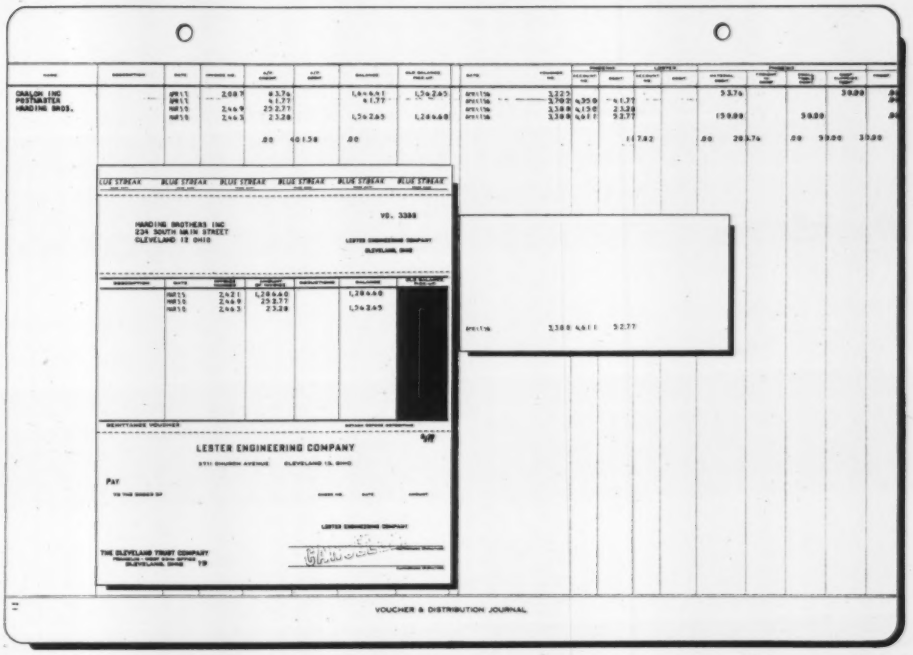

Figure 2. Unusual machine accounts payable plan combines voucher, remittance advice, journal and distribution. Major classifications are distributed to columns, others to distribution "tickets" like the one shown. These are later sorted and posted to ledger cards.

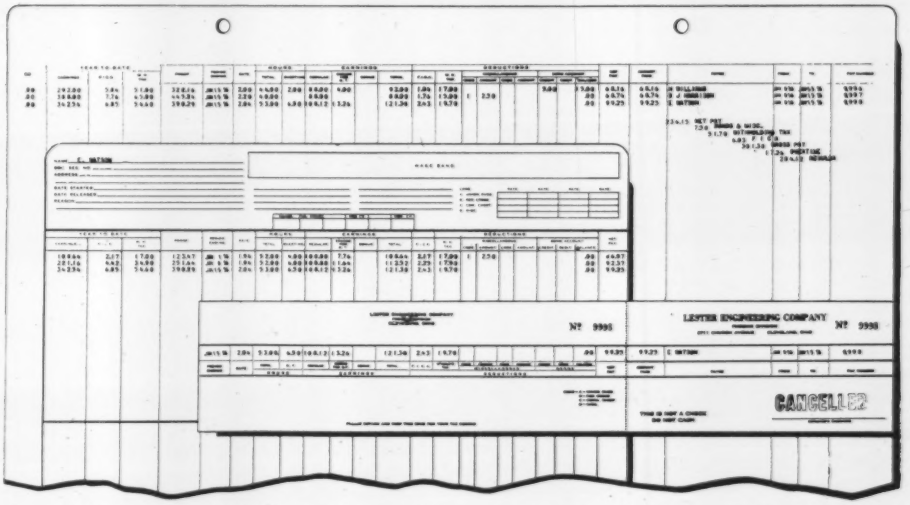

Figure 3. Payroll is another "all-in-one" machine operation. Gross and net pay are machine-figured, and year to date totals for earnings, F.I.C.A. and withholding tax are automatically printed on each employee's earnings record.

Once a month, the tickets are sorted by account and totals posted, along with column totals, to the general ledger. All general ledger postings, incidentally, are made by machine.

The check-writing operation, also mechanized, includes automatic dating, consecutive numbering and protection of checks, with a check register produced as part of the same job.

Payroll Made Easier

The operation of preparing the payroll by machine emphasizes not only the combination of related forms, but many different additions, deductions and balance computations as well. As you can see in Figure 3, the individual earnings record, employee's pay statement, payment receipt, and payroll journal are done in "one shot". (If we had a check payroll, a check would be written instead of the payment receipt). The following are all figured and printed automatically by the machine (a National "Model 31"):

1. Gross and net earnings;
2. Earnings for the year to date;
3. F.I.C.A. for the year to date;
4. Withholding tax for the year to date;
5. Employee's bond balance;
6. Individual totals of all earnings and deduction columns on the journal.

Anyone in the field of accounting is

Installation Of New S.A.M. San Diego Chapter

Advisory Committee of the new S.A.M. San Diego Chapter meets with S.A.M. Executive Vice President Harold R. Bixler, after the installation ceremony. Left to right: **Charles L. Terrel,** Convair, A Division of General Dynamics Corporation Vice-President Program; **Elmer P. Wohl,** Executive Assistant to President, Convair, A Division of General Dynamics Corporation and National Director of San Diego Chapter; **James F. Anderson,** Assistant Vice President, The First National Trust and Savings Bank of San Diego and Treasurer of San Diego Chapter; **Mr. Bixler; Milton F. Fillius, Jr.,** Vice President and General Manager, National Steel and Shipbuilding Corporation and President of the San Diego Chapter; **Mrs. Frances B. Torbert,** Chairman of Department of Management, San Diego State College, Member of Board of Directors of The Marston Company, and Vice President of Membership of the San Diego Chapter; **Robert H. Biron,** Vice President of Administration, Convair, A Division of General Dynamics Corporation. Not shown in the photograph but also a member of the Advisory Committee is **Henry L. Nunn,** Former Chairman and President of Nunn-Bush Company (now retired.)

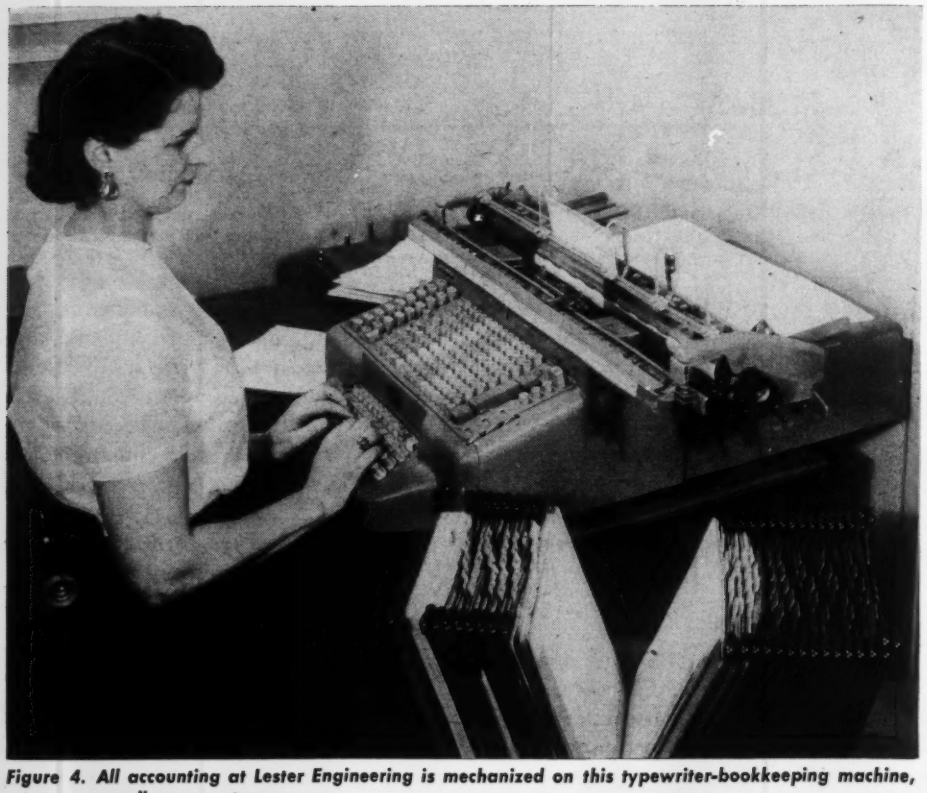

Figure 4. All accounting at Lester Engineering is mechanized on this typewriter-bookkeeping machine, an all-purpose type.

familiar with hand payroll methods, and can compare the systems and draw his own conclusions.

No Special Knowledge

As one more proof of work simplification, it should be mentioned that the machine procedures require no specialized skills or training. Anyone who can use an adding machine and can type, even with one finger, can run our accounting machine. The operator need not even know a debit from a credit; it is a matter of entering figures and typing in a standard, set procedure.

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PETER E. DUTCHER has had twenty-six years of experience in Industrial Engineering. He has been with the Rome Cable Corporation since 1946. He served with the Revere Copper and Brass Company from 1929 to 1946, leaving the position of Senior Time Study Engineer to go with the Rome Cable Corporation. Mr. Dutcher is Vice President of the S.A.M. Central New York Chapter.

Interference And Leveling On Multiple Machine Groups

by Peter E. Dutcher

Chief Time Study Engineer
Rome Cable Corporation
Rome, N. Y.

ARTICLES on interference generally, have created the impression that interference can be figured through a mathematical formula which gives a cut-and-dried answer under all conditions. In my practice I have found that interference must be leveled and in most cases is a bigger factor than the usual leveling under timestudy procedure.

Interference is the amount of time a machine is down waiting for service while the operator is servicing the next machine. Although interference can be timestudied, it does not give you the picture of what should happen, it only shows what actually is happening. Interference is caused and created by elements of work, and these in turn, according to methods, increase or decrease interference. Interference when being timestudied also shows only what is happening at that particular time and reflects only the product mix and conditions at that time.

Ratio delay and Work Sampling can also be used to measure interference but here again it only shows what happened at that particular time with those particular elements, product mix, and etc.

The attached chart, (Number 1) on interference shows the maximum amount of interference to be expected on any multiple machine group. Two factors are indicated; the number of machines an operator is tending, and the percentage of work hours to cycle time. The percentages shown is the amount of increase in time a single unit is going to be down over and above running time, down or service time, and unavoidable time. In other words, the total of run, down, and interference is the expected production time per unit. Personal and fatigue is added later.

Charts Numbers 2 and 3 are the build-up of the interference chart. In chart Number 2 50% of work time to cycle time shows 2 machines and shows 100% normal* capacity that the 1st machine would be running, and 75% on the second machine. This is on the basis that the operator would keep Number 1 machine running 100% of the time and any available man time left over would apply against Number 2 machine. On number two machines the odds would be that 50% of the time he would keep it running and 50% of the time he would not. On his 50% chance the machine would run 100% capacity. On his second 50% the machine would not run but would lose 50% capacity. It would then be assumed that 50% and 100% would equal 75% of the time number 2 machine would be running.

Chart Number 3 shows the average capacity for the two machines. 100% on Number 1 machine and 75% on Number 2 machine averaged 87½% capacity for both machines.

To increase 87½% to 100% requires 14.3% increase or 14% interference allowance.

Our chart shows us *maximum* interference and this is on the basis that the job has no opportunities for syncronization. Speeds, bobbin sizes, breakage, orders etc. are all highly variable. Under these conditions there are very few chances of syncronizing the work. Now let us assume that all machines are the same speed, all bobbins the same size and no breaks. Here the operator plans his work so that not only does he eliminate interference, but his machines run out in a predetermined order. For example: to start he would start No. 1 machine, then Numbers 2, 3, 4, and etc. On the same basis Numbers 1, 2, 3, and 4 would run out in the same order and this would continue indefinitely until the pattern was broken by other influences such as personal needs. Foremen issuing orders, etc.

Some machines today, in multiple groups, have automatic stops while others do not. Automatic stops reduce amount of work, thus making it possible to run a larger group of machines, but interference can be greater with automatic stops than otherwise. With an automatic stop the operator waits or can not determine the exact time of stoppage

* *Machine and necessary down time.*

of a machine. The other way the operator stops his machine at such a time that makes it possible to syncronize his work and still have acceptable bobbin, spool, or reel sizes.

Another example is an operator running a group of machines or spindles and is required, due to quality, safety, etc., to stop all of his machines at once and start them up at once. In this manner there is interference from one machine to the next, but it becomes a time-studied element and interference charts are not needed. For that matter the time lost in this manner is greater than the interference allowance and can show an extreme loss in production.

In other cases it is possible to assign a number of machines greater than the operator is able to handle. In this case the productive figure of the operator is not concerned with interference as his measure of production is strictly what he does and not what the machine does. This method only becomes practical when the cost of the extra machines becomes negligible as production per extra machines becomes extremely low.

The above comparisons are brought out on a basis of generally not having full machine loads. When percentage of work to cycle is 10% then it is expected to have 10 machines in a group.

It must be remembered that above figures and interference allowances are used by orders, different spool put ups etc., and that in actual practice a group of 10 machines run by one operator can have orders where a man can run 30 machines and at the same time have orders where he can only run three machines but he still runs ten in a mixed order.

Chart Number 1

INTERFERENCE PERCENTAGE (to be applied against cycle time)

Percentage of Work Hours to Cycle Time

No. of Machines Tended	% 2	% 2.5	% 3	% 4	% 5	% 10	% 12.5	% 20	% 25	% 33	% 50	% 100
2	.5	.6	.8	1.0	1.2	2.5	3.0	5.0	6.5	9.0	14.0	—
3	1.0	1.2	1.5	2.0	2.5	5.0	6.0	11.0	14.0	20.0		
4	1.5	1.7	2.0	3.0	4.0	8.0	10.0	17.5	23.0			
5	2.0	2.5	3.0	4.0	5.0	11.0	13.5	25.0				
6	2.5	3.5	4.0	5.0	6.5	14.0	17.5					
7	3.0	4.2	4.8	6.5	8.0	17.5	22.0					
8	3.5	5.0	5.5	7.5	9.5	21.0	26.5					
9	4.0	5.5	6.3	8.5	11.0	25.0						
10	4.5	6.0	7.3	10.0	12.5	29.0						
11	5.0	7.0	8.0	11.0	14.0							
12	5.5	8.0	9.0	12.5	16.0							
13	6.5	9.0	10.0	13.5	17.5							
14	7.0	9.5	11.0	15.0	19.0							
15	7.5	10.5	11.5	16.5	21.0							
16	8.0	11.0	12.5	17.5	23.0							
17	8.5	12.0	13.5	19.0	25.0							
18	9.0	13.0	14.5	20.5	27.0							
19	10.0	14.0	15.5	22.0	29.0							
20	10.5	14.5	16.5	23.5	31.0							
21	11.0	15.5	17.5	25.0								
22	11.5	16.5	18.5	26.5								
23	12.5	17.3	19.5	28.0								
24	13.0	18.5	21.0	29.5								
25	13.5	19.3	22.0	31.5								
26	14.0	20.0	23.0									
27	15.0	21.0	24.0									
28	15.5	22.0	25.5									
29	16.0	23.0	26.5									
30	17.0	24.0	28.0									
31	17.5	25.0	29.0									
32	18.5	26.0	30.0									
33	19.0	27.0	31.5									
34	20.0	28.5										
35	20.5	30.0										

Note: Above percentages are limits of interference. Actual conditions will be as above or less due to the degree of synchronization of work.

Average interference will be 25 to 75% of above.

August 25, 1948.
Peter Dutcher
ds

ACTIVITY CHARTS — Number 2

Percentage of Normal Capacity Each Machine in a Group Can Be Run

% of Work Hours to Cycle Time	*Machs. able to Service Efficiently*	*1st Mch.*	*2nd*	*3rd*	*4th*	*5th*						
1%	100	100	99.5	99	98.5	98	Minus	.5	for each succeeding mach.			
2%	50	100	99	98	97	96	"	1.0	"	"	"	"
2½%	40	100	98.8	97.5	96.3	95	"	1.25	"	"	"	"
3⅓%	33	100	98.5	97	95.5	94	"	1.5	"	"	"	"
4%	25	100	98	96	94	92	"	2.0	"	"	"	"
5%	20	100	97.5	95	90	87.5	"	2.5	"	"	"	"
10%	10	100	95	90	85	80	"	5.0	"	"	"	"
12½%	8	100	94	88	82	76	"	6.0	"	"	"	"
20%	5	100	90	80	70	60	"	10.0	"	"	"	"
25%	4	100	87.5	75	62.5		"	12.5	"	"	"	"
33%	3	100	83	66			"	17.0	"	"	"	"
50%	2	100	75				"	25.0	"	"	"	"
100%	1	100										

LEVELING is done by judgment. augmented by comparisons, timestudy of interference, training of operators in patterns and synchronization, and the overall picture backed up by all day time and motion studies wherever necessary.

A very important part of the interference factor is getting an accurate work time per order or item. The basic elements of get, do and dispose for spools, bobbins or whatever the product is, offers not too much difficulty but variables of breakage, adjusting and etc. require considerable statistics and care.

Another item which is considered work is attention. Attention generally is what is left over after all timed physical duties have been covered. The act of gauging, walk and look, minor adjustments are still timestudy figures in conjunction with statistics. Attention is when an operator is apparently idle in the vicinity of his machine but still is in a position to see, hear, smell, and think. Although apparently idle, he still may be using his eyes, ears, nose, throat and brain in conjunction with the production being produced.

To decide what amount of supposedly idle time, on the part of operator, is work, while the machine is running requires numerous methods to arrive at a figure. Pooled judgment is used in the same manner as establishing job evaluation. Statistics, comparisons, observations are used, and the use of MTM is also being explored.

In some cases the amount of floor-space to be covered, the number of gadgets on a machine, quality control requirements, etc. all lead to a good practical figure.

Method Time Measurement which

Chart Number 3

Percentage of Normal Capacity Groups of Machines Can Be Run

% of Work Hours to Cycle Time	*Machs. able to Service Effi-ciently*	*1*	*2*	*3*	*4*	*5*					
1%	100	100	99.8	99.5	99.3	99.0	Minus	.25	for each	additional	mach
2%	50	100	99.5	99.0	98.5	98.0	"	.50	" "	"	"
2½%	40	100	99.4	98.8	98.2	97.5	"	.67	" "	"	"
3⅓%	33	100	99.2	98.5	97.8	97.0	"	.75	" "	"	"
4%	25	100	99.	98.	97.	96.	"	1.0	" "	"	"
5%	20	100	98.8	97.5	95.	92.8	"	1.25	" "	"	"
10%	10	100	97.5	95.	92.5	90.	"	2.50	" "	"	"
12½%	8	100	97.	94.	91.	88.	"	3.0	" "	"	"
20%	5	100	95.	90.	85.	80.	"	5.0	" "	"	"
25%	4	100	93.8	87.5	81.3		"	6.25	" "	"	"
33%	3	100	91.5	83.			"	8.5	" "	"	"
50%	2	100	87.5				"	12.5	" "	"	"
100%	1	100									

Note: Variables will occur in actual practice due to variable reel lengths, sizes, breaks, unavoidable delays, etc. Personal and fatigue time is also not included in the above percentage.

uses factors of eye travel time, eye focus etc., appears to be a tool that might be used but would require some experimenting and digging, along with time-study and statistics.

Automatic stops have a large affect on attention. The fact that a machine stops automatically frees the operator from attention and in some cases allows him to leave his machine for personal needs without shutting down his machines.

The above interference chart is not a cure-all but is intended as a basic tool which along with timestudy, methods of synchronization, patterns, statistics and judgment makes it possible to set a good practical standard. ■

Would You Hire Your Son?

by Perrin Stryker

"If I were the sole owner of a large establishment, the one thing I would be sure *not* to do is to take my son into it. Why? Business has enough unavoidable difficulties and unpleasantnesses in promotions, raises, and firings, without having to decide whether to promote, raise, or fire your own son. It is embarrassing to the father and disrupts any good relationship with his son. In terms of ethics, nepotism is immoral. I believe in the rights of private ownership, but not in hereditary power, particularly in publicly held corporations. Look at the people who are affected—the owners, the management, employees, suppliers, public, stockholders. It seems clearly immoral to endanger an operation of such importance to so many by handing it on the someone who has no qualification except a birth certificate."

This free-swinging opinion was recently delivered by a man who spent over twenty-five years in a company whose management was thick with relatives. His emotional and somewhat confused obiter dicta would seem to imply that the hiring of a man's son anywhere in the father's company is to be regarded as nepotism and to assume, further, that the son invariably lacks ability. The dictionary definition of nepotism, of course, is the advancement of relatives on the basis of family rather than merit. But the executive quoted above is not alone in his belief that relatives per se are bad business. For example:

- "Personally, I would not employ a relative. It's unfair to the relative and possibly unfair to others. A relative is trouble."—President of a construction-products company in Massachusetts.
- "We wouldn't even hire a woman as a secretary if she were so much as a niece of an executive."—Personnel manager of a steel-products company in Kansas.
- "I've never given a relative of mine a job. Neither of my two sons has a chance of getting into this company."—James Beckett, chairman of the executive committee, Interchemical Corp., New York—one of the few executives willing to have their views on the subject attributted to them.

These are drastic opinions of a practice that is widespread in U. S. business. For the fact is, relatives hire relatives right and left. A survey by FORTUNE of the top executives of 175 of the largest U.S. corporations revealed that no less than 55 per cent of the companies had close relatives or in-laws holding management jobs in the same company. In an earlier study of 8,000 executives made in 1952 by Professor Lloyd Warner and James Abegglen at the University of Chicago, it was found that two out of every five men whose fathers were top-ranking executives and three out of every five men whose fathers were owners of large business had positions in their fathers' companies.

Excerpted from March 1957 FORTUNE.

WILLIAM B. McGORUM, Jr., spent four years travelling for the American Brake Shoe Company as a service man before joining The Heald Machine Company, where he is currently Sales Engineer. Mr. McGorum is a B.S. Mechanical Engineering graduate of M.I.T. (1950) and a M.B.A. graduate in Marketing from Columbia University (1952).

Orienting The Management Recruit

by William B. McGorum, Jr.
Sales Engineer
The Heald Machine Company
Worcester, Massachusetts

TOP EXECUTIVES today are urgently concerned with a problem no less vital than it is perplexing: Where and how is business going to secure the raw material for tomorrow's managers? And even more important, what success will the individual enterprise be likely to have in converting that raw material into the finished executive product?

In today's rapidly expanding economy there occurs not only the normal attrition in management ranks but also the continuing creation of new posts of managerial responsibility. The necessity for maintaining a pool of trained replacements large enough to plug the old gaps as well as fill the new has put an increasing strain on the primary source of supply—the nation's colleges and universities. Their productive capacity is reported to be barely equal to the task of turning out graduates at a rate commensurate with demand. Herein lies the paradox of the early, on-the-job disillusionment experienced by many a college graduate.

Consider, for example, John Jones, Student, as he undergoes the metamorphosis from collegian to management recruit. Campus life and the collegiate atmosphere are hardly calculated to foster more than an incomplete, largely distorted notion of what lies ahead for him "on the outside." Bolstered by the confident knowledge that he is a commodity in short supply in a seller's market, he views the future with serene nonchalance. As a senior student ready for his first job, he finds the employment possibilities no less than breathtaking.

The expression, "job hunting," is largely outmoded; it has been superseded by its modern counterpart, "interviewing." Once he has entered the recruitment arena, John Jones finds it more appropriate to brace himself against the onslaught of company interviewers than to write letters of solicitation. He finds himself the object of an intensive courtship the likes of which he has never seen before—and may never see again. He is literally brought to the top of the mountain to look out upon the vistas of opportunity stretched before him. It is an exhilarating experience, to say the very least.

In choosing a company from among the many offers available, John Jones is likely to be motivated in his decision to a considerable degree by the warm personalities and air of success of the men with whom he has talked. They exemplify to him the enviable status of those who people the upper reaches of the business world. He identifies himself as a potential member of such a select environment. It is easy for him to get the impression during his interviews that his particular qualifications have somehow scored a direct hit with these high echelon men. He thus looks forward enthusiastically to the beginning of a contributive career under the friendly, stimulating guidance of individuals such as these. At the same time, he knows there is a ready market for his services elsewhere.

The college graduate coming into an organization is valuable chiefly because of his potential, not because of his intellectual or technical competence measured academically. He has been educated generally; now it is necessary that he be educated specifically regarding the company, its products, and its way of doing business. Only then can he begin to develop and grow into an outstandingly useful man within his specialized area.

The training program has been conceived by many companies as an efficient means of preparing the graduate for a truly productive function. It gives management an opportunity better to assess the talents and potentialities of the trainee. It provides the trainee with a broader foundation upon which to shape his business career. Whether the program is organized or disorganized, formal or informal, seems to be a matter of individual corporate size and philosophy.

Once the trainee has started working, his most immediate initial concern will probably be that he has not been forgotten by the men who hired him. He may find that he is working for someone

who appeared only briefly or not at all in his interviews. He may find that he is being shipped out into the hinterlands far from the comforting warmth of the home office. It thus may come as a jolt to discover that he does not have contact with those men whose caliber so impressed him during the negotiation stage. If, because of this, he feels he has been decoyed in under false pretenses, his early morale may suffer accordingly. With more experience, however, he will look back and see that he had no legitimate reason to expect a continuance of solicitous, top-drawer attention.

IT PROBABLY is important, though, for the trainee to feel that there is top-level counsel available to him for advice and encouragement upon reasonable request. The mature trainee will not try to abuse the privilege of such a pipe-line. It is obvious enough that any undue appearances of favoritism can react with insidious consequences not only on a training program but on an organization as a whole. The trainee wants recognition, to be sure—a basic human trait. He wants, and can reasonably expect, no more than a square deal according to the ground rules established when he was hired. He wants to know when he is doing a good job, and conversely should expect to be told frankly but fairly when his performance is below par. If he has a crown prince complex, early clarification will benefit all concerned. It will perhaps help the trainee for him to understand that his progress within the company is primarily up to him, that his college degree by itself imparts no magnetic affinity for the upper regions of management.

For the trainee, who may have been a "big man on campus," or who at least enjoyed the distinction and prerogatives of a senior student, the training program is often a time of disenchantment. He is shorn of his previous status. He discovers, somewhat to his surprise perhaps, that he is virtually isolated from the high-level executives under whose auspices he entered the company. He finds he is working mainly with folks of long experience who are little impressed by his knowledge of differential equations or Renaissance literature. He perhaps feels that his talents are being overlooked. This may be a crucial period when his enthusiasm begins to wear thin.

But management cannot very well sell a man on an opportunity by being too brutally frank about its less attractive aspects. The difficulty is compounded by the fact that relatively few graduates have a clear idea of their specific objectives. Summer jobs notwithstanding, they have little or no basis for comparative evaluation either industrywise or companywise. Further, they cannot really know what opportunities exist within a particular organization until they have been associated with it for a sufficient length of time—just about long enough for the company's training investment to begin paying off. Business does not invest in the recruitment and training of college men for charitable reasons—a self-evident but nonetheless important truth. It should be made apparent to the trainee, therefore, that he represents a sizeable investment which will reap no significant reward for some years to come.

If the trainee can view his position from the eyes of the man without a college degree—a man, for example, whose prospects for advancement beyond a certain level may be dim indeed—he will find himself quite favorably situated by comparison. But it becomes increasingly apparent that he really is starting from the bottom and that he must initially prove himself on the basis of his ability to get along with all kinds of people.

He hopes his performance is being reviewed and evaluated at reasonable intervals by unseen executives who peer down on his progress inconspicuously from above. He assumes these men are hoping that he will vindicate their judgment by the type of performance he turns in. He can be reassured at being called upon to submit reports as he progresses from stage to stage of his training. Probably at no other time for a number of years afterward will he thus have an opportunity to bring himself to the attention of so many of the top people in the organization.

With the demand for their services so spectacular elsewhere, the rate at which trainees disaffiliate is sometime disquieting. Many trainees survive their early disenchantment without changing jobs. Others are lured away by advertisements promising unlimited horizons and a better way of life. Still others, feeling that their abilities are being frustrated in non-productive or semi-skilled channels, stay on the job with spirits at low ebb.

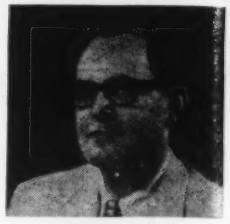
Ideally, the incoming trainee should be hand-picked for his willingness to undergo, among other things, whatever preliminary program lies ahead. For those of long-range outlook, the months of semi-skilled training effort offer the opportunity to become intimately familiar with many seemingly minor details which may make all the difference later on between a top-notch administrator and a tolerably good overseer. Here is the chance to find out how a sample cross-section of the working population think, how they are motivated. Here is the chance to discover that things are often not done according to the textbook, or for that matter even the standard practice manual. This is a probationary period of adjustment during which time the trainee can, if he will, take aboard a remarkable amount of general background experience as well as fundamental, specialized knowledge.

There is one particular hazard which may occur toward the end of the training program or immediately afterward. It may happen that a man who has almost completed his training is indefinitely kept at work which does not relate to his training schedule. He finds that the early ground rules have been revised. He is delayed enroute, so to speak, during which time he is in the position of ambassador without portfolio. He is still a trainee, yet he is not doing strictly trainee work. He is virtually in limbo, or so it seems to him, forgotten by management in its preoccupation with other matters. By this time he wants to know officially where he fits into the organization. He wants and needs to belong.

UNLESS he is to be the beneficiary of unusually fortunate circumstances, the graduated trainee still cannot look forward to a job of substantial responsibility for a number of years. A capable, ambitious person will become unhappy very quickly if he comes to feel that he is spinning his wheels too long in one spot, a spot which he thinks does not permit him to reach out into new areas of experience and responsibility at a rate compatible with his development. He is faced with the complex problem of trying to evaluate his progress from the limited view he has of his future prospects and the company as a whole. He is trying to formulate a reliable yardstick against which he can compare his situation with that of his contemporaries in other companies.

It is a prime responsibility of management to maintain communication with this individual and to keep his morale intact during this period. Whether he stays or leaves during these critical, formative years will be determined by the understanding, discernment, and mutual respect which underlies his relationship with his superiors. ■

INGO INGEHOHL is a Canadian of Danish descent, a graduate in Civil Engineering of the Technical University, Berlin. After working for some years in building and construction, Professor Ingehohl became interested in the works of Taylor and Gilbreth and returned to the university for study in Scientific Management Techniques, concluding with a Ph.D in Industrial Psychotechnique. He joined the du Pont Company in Canada in 1950, was appointed to M.I.T. in 1955.



Personality Tests— Just What Are They Talking About?

by Ingo Ingehohl
Assistant Professor
Industrial Management
Massachusetts Institute of Technology

PSYCHOLOGICAL testing is quite popular these days. What once started as a highly experimental attempt at "measuring the mind" of just a few of our parents when they became of school age has today developed into literally thousands of forms by which you and I, who are "in the field", attempt to measure everyone within reach: small children, big children, adults and employees, the sick as well as the healthy and even those who have retired. It is something we are just beginning to learn to live with and something our children will probably not know how to live without.

And what are these thousands of forms? Most of them—paper forms, test blanks, so-called "paper and pencil tests". For publishers, printers, consultants and psychologists a new business. A product not unlike so many others of our business world: unknown only 40 years ago.

A recent study by FORTUNE magazine speaks about a really fantastic case: the Bernreuter Personality Inventory, by far the most widely used personality test in business, was said to have sold over one million copies in a *single* year (1953) and that through only *one* of it's several distributors![2]

Bellows[3] reports findings from a number of large surveys made on the use of tests in general in this country. From these findings he estimates that 20 million Americans will take about 60 million different tests in any *one* year. Truly, this includes "everything": men, women, boys and girls. It probably includes Armed Forces Programs as well as industrial and educational applications. It most certainly includes aptitude tests, trade tests, intelligence tests as well as those personality tests which we are interested in here. Surely, these figures illustrate very well that psychological testing has become "big business".

Is Wide-Spread Use Synonymous With "Popularity"

Although psychological testing *is* in wide-spread use, our statement that testing "is popular" may not be entirely accurate after all. We cannot, of course, be sure whether testing is really as "popular" on the receiving end as it seems to be on the giving end. TIME reported the story of angry parents literally storming the office of a local Kindergarten superintendent, a conscientious educator, who had dared to *apply* the findings of psychological tests. When he flunked 50% of those in the new crop, that actually were of less than legal entry age, (because he was convinced that these children simply were not ready to leave the home for the more sociable but less individualistic atmosphere of the school) the parents raised such a fuss that psychology had to retreat.[4] Granted, this is a rare case. Usually, there does not seem to be too much debate between the "giving" and "receiving" sides on the general usefulness of aptitude tests, trade tests or even intelligence tests.

It is in the realm of personality testing, however, that even "the experts are in disagreement". At least so it may seem to many an outsider. Whyte's previously cited FORTUNE article certainly threw the issue wide open as far as the executive and his personnel manager are concerned.

Many Criticisms Are Raised

Harsh words are loudly spoken. Sometimes by people who are either ignorant of scientific processes or who are frustrated by the slowness of the scientific progress. Sometimes even by those who ought to know better. What really takes place, of course, has nothing to do with

[2] *William H. Whyte, Jr., "The Fallacies of Personality Testing", FORTUNE, September 1954, p. 119.*

[3] *R. M. Bellows, "Psychology of Personnel in Business and Industry", 2nd ed., Prentice Hall, New York, 1955, p. 280.*

[4] *TIME, September 5, 1955, p. 45.*

"disagreement of the experts". The scientists are probing in all directions for answers.

There are many directions we can go. There are many psychologists. Naturally they go along different paths. They all have only one goal in mind: the same goal; the truth, truthful answers to very legitimate daily questions of the personnel manager. What does a good executive look like, personality-wise? What does a good foreman look like, personality-wise? Are you psychologists ready with personality tests that I can use with confidence? Or aren't you?

And then, of course, there is always the fellow who says "it can't be done". Who ridicules any and all new efforts because they are not 100% perfect. In the improvement process we call this attitude "resistance to change" thumbs down. The one fellow who zealously sees the 10% wrong in a new idea and is eager to reject it, including the 90% right in it

Psychologists themselves are not quite free of guilt in contributing to this confusion. Psychology is a *new* science. In such a stage of search for knowledge many schools develop. New words are coined to formulate and solidify new concepts, notions or insights. Psychology probably more than any other science has rapidly developed a jargon of its own, much good, some fad, some fancy. This jargon will not become meaningful to you, the prospective user of psychological tools, until these words become proven and accepted concepts.

The situation is much like the one we face with these modern electronic computers. They, too, *are* making their way into our businesses. Useful as they are in helping us make better decisions, they are just as incomprehensible inside. Should, for some reason or another, the answer turn out to be seemingly wrong, there is, for most of us, little use in opening the hood. A mere look at the spaghetti of wires inside will quickly scare most of us from even trying to find out what went wrong and why.

Personality tests are somewhat in the same category—a spaghetti of words that leave the user with an uncomfortable feeling of being at the mercy of the experts.

Does This Have You Confused?

There you are, Mr. Personnel Manager: you are already swamped with tests and daily you hear of new ones being offered. The psychological literature whispers in your ear: "try this one . . ."; the critic and/or the employee, who sits suspicious and scared on the receiving end, may well whisper or *shout* into your other ear: "it can't be done".

In between are you. You have the problem of selecting the good, finding the gifted, training the slow. You have to; that's your job, and, besides, you want to. Somehow you have a faint feeling that you could really help your people toward better, richer and happier lives of employment if you knew more about the factors of personality. But you also know that you first have to find these people and identify them: the slow, the gifted, and the troublemaker, before you can *do* what you have planned to do with them and for them.

So, you *are* in the middle. No wonder you ask: "Personality tests—just *What* are they talking about?"

How To Describe "Personality"

The need for describing personality is not new. It is probably as old as mankind itself. Ever since we discovered that "people are different" there has been a real need to predict what they might do next and how to meet them on their own ground. From this need came a lot of trys. The trouble has only been that we didn't know—and probably still don't know—what we are talking about. No two persons will have exactly the same thing in mind when they are trying to describe someone's "personality". This is most likely the main reason why our predictions about what such-and-such a person might do in the next situation have been rather ineffective; *invalid*, as the modern psychologist would say.

Well, modern psychologists finally did define what they mean by "personality", that is, when they are talking among themselves. We shall here refer these definitions to a footnote or two. Mankind in the past did no such thing, and even people today—whether they happen to know about the psychologists' definitions of personality or not—may not necessarily feel bound to them as they may seem rather complicated.[6] [7]

What man *has* done throughout history, and still *is* doing today, is happily but inadequately describing what is so complex: individual uniqueness. Bold predictions about a person's future action are all too frequently implied by his statements without a clear concept of what is needed, what is relevant and what will be useful in predicting behavior.

Types

We are all familiar with the age-old classification and pigeonholing of people *and* their actions by bodily types. We kind of *expect* the little fat fellow who bounces around on his short legs to be jovial and good natured, while we are somewhat apprehensive of the thin, tall, frail man with deep-lying eyes. What we are actually apprehensive about is not so much his looks but the possibly dangerous actions that society, throughout history, by some mysterious process of misunderstood experience, has associated with his "type". Serious scientific research of just what possible correlation there might be between physical characteristics and behavior is of rather recent date,[8] and as yet inconclusive.[9] This, however, does not prevent people, even today, from continuing to stereotype other people, be it by bodily characteristics or by such equally old formulae as temperamental "models". "He is the extrovert type" or "she is the submissive type", or even by the four ancient Greek types of temperament: *sanguine* (warmhearted and emotional); *phlegmatic* (slow and calm); *melancholic* (depressed and unpleasant); *choleric* (quickly angered and strong). All such typings are greatly oversimplified attempts to cope with the tremendous problem of describing the individual as a whole and in all aspects of his interpersonal relations. Their fallacy lies in the fact that typing asserts too much about a person and describes too little. Dramatic but probably isolated moments of behavior become the label for a model that rarely exists in purity.[7]

To analyze all the things a person does in real life is in the end a hopeless undertaking. We *must* make some choices of what to describe in order to understand and predict behavior.

It is from the search for what might be most helpful that the psychological theory of traits has evolved. Traits are *dimensions of personality* that are characteristic of many people and yet at the same time distinguish a particular in-

[6] *E. R. Hilgard, "Introduction to Psychology", Harcourt Brace & Company, New York, 1953, p. 407.*

[7] *C. T. Morgan, "Introduction to Psychology", McGraw-Hill Book Company, New York, 1956, p. 638.*

[8] *E. Kretschmer, "Physique and Character", 1942.*

[9] *W. H. Sheldon, et al., "The Varieties of Human Physique", Harper Brothers, New York, 1940.*

dividual by determining whether he characteristically shows *more or less* of the behavior defined by the trait. Such aspects of personality could, for example, be emotional stability, dominance, or gregariousness, to name only three of an infinite number of possible trait-dimensions for which each person may find his particular place on a scale. Having been properly located on each of many such scales, the particular *combination* of all these dimensions eventually places the person in some area of a multi-dimensional space where he hovers as the unique individual he is. Perhaps, we may say, like some chemical substance, made up of certain basic elements but unique in the combination of how much of each went into the particular compound. These basic elements of personality are what the psychologists have called traits.

There are as many traits or dimensions as you may like to think of. Any good dictionary will list approximately 4000 words that describe how people think and feel and act; each one of which we might accept as a possible "trait". The question is again one of selecting what would be most helpful and most significant as useful scales. If we could just find the "most common", traits, each fairly distinct from the other, then we would probably have a set of scales or dimensions which is still manageable and yet capable of describing the unique composition of every individual's personality.

Indeed, some researchers believe that with modern statistical and experimental methods we might someday be able to express what we want to describe with about twelve[10] or even fewer such traits.[11]

[10] *R. B. Cattell, "Description and Measurement of Personality", World Book Company, Yonkers, New York,* 1946.

[11] *L. L. Thurstone, "The Dimensions of Temperament", University of Chicago Press,* 1947.

Production Record Breakers

Abilities, Inc., which employs only disabled persons, has a safety record so good that in 1955 its compensation insurance rate was cut 26 per cent. President of Abilities, Inc., Henry Viscardi, Jr., reports also that absenteeism among the handicapped workers is just a fraction of the average reported by firms employing unimpaired workers.

Adapting Cattell's list of twelve traits for our purpose, the dimensions of personality may look like this:

Primary Traits of Personality* Dimensions

From	To
Emotionally expressive	Reserved
Intelligent, smart	Unintelligent, dull
Stable, realistic about life	Emotionally vacillating
Confident, aggressive	Unsure, complaisant
Cheerful, joyous, humorous	Depressed, pessimistic
Adventurous	Withdrawn, shy
Socialized, cultured, poised	Boorishness, socially clumsy
Positive, persevering	Dependent, fickle
Sensitive, infantile	Mature, tough, self-sufficient
Trustful, tolerant	Suspicious, intolerant
Bohemian unconcernedness	Conventional practicality
Sophistication, logical	Simplicity, sentimental

* *Adapted from: R. B. Cattell, "Description and Measurement of Personality", World Book Company, Yonkers, New York,* 1946, *by permission of the publisher.*

Now let's take a look at the many and sundry specimen sets of personality tests that you no doubt have in your files. For there are many test authors and literally legions of personality tests on the market. Skimming through these forms there seem to be literally hundreds of traits accumulated in this literature, and no one of the authors seems to use quite the same ones.

Comparing Personality Tests

If we compare just a few of the more wide-spread personality tests with those basic traits suggested by Cattell, we find on the surface little agreement indeed. Table 1 lists the fifty-eight trait titles from nine of the better known instruments for measuring and describing personality,* together with their authors and a few tentative explanatory meanings for some of the more "technical" terms. Surely, Table 1 suggests that there are a good deal more than a dozen traits in use. On closer examination we may perhaps make these three observations:

1. The list is long.
2. Many words are unexplained.
3. Some duplicates seem evident.

If you were faced with the task of choosing the one instrument of personality testing which would be most appropriate for your particular problems, a mere listing of traits employed will probably be of little or no help at all. There may be some legitimate doubt in your mind as to whether every one of these test authors really *has contributed new traits* important to our knowledge of adequate personality description. Or, could it be that test authors merely give new titles to the same basic traits? From Table 1 alone we can't tell. Taking another look at these trait titles the key question now in your mind might well be: Personality tests—just what *are* they talking about?

Assorted Traits

There *is* perhaps a way of answering this question of yours. If we could only find a sort of common denominator by which to sort the many "technical" terms that are presently used as trait titles into some logical structure or into some larger categories. These categories will have to be much broader than what is commonly called a trait. They might well be groups of related traits.

Indeed, there seem to be three very broad categories into which most of the commonly used traits may first be grouped for better understanding. Most personality tests are likely to contain:

First: Scales by which to measure traits associated with a person's characteristic *level of activity.*

Second: Traits associated with the *attitudes* a person seems to exhibit fairly consistently.

* 1. *L. L. Thurstone, "Thurstone Temperament Schedule", Science Research Associates, Chicago,* 1950, 1953.
2. *R. C. Bernreuter, "The Personality Inventory", Stanford University Press,* 1938.
3. *J. P. Guilford & Martin, "Inventory of Factors S T R D C", "Inventory of Factors G A M I N" and "The Guilford Martin Personnel Inventory", Sheridan Supply Co., Beverly Hills, California,* 1943.
4. *C. R. Adams, "The Personal Audit", Science Research Associates, Chicago,* 1945.
5. *D. G. Humm, "The Analysis of Disposition or Temperament", Doncaster G. Humm, Los Angeles, California,* 1938.
6. *J. N. Washburne, "Washburne Social Adjustment Inventory", Thaspic Edition, World Book Company, New York,* 1936.
7. *S. R. Hathaway & J. C. McKinley, "Minnesota Multiphasic Personality Inventory", Revised Manual* 1951, *The Psychological Corporation, New York,* 1951.

PERSONALITY TESTS: A List of Traits Used

Author and "Test"	Title of Trait or Scale	Meaning
Thurstone "Temperament Schedule"		
(A)	Active	
(V)	Vigorous	
(I)	Impulsive	
(D)	Dominant	Initiative, Leadership
(E)	Stable	Emotionally stable
(S)	Sociable	
(R)	Reflectiveness	Meditative, theoretical thinking
Bernreuter "Personality Inventory"		
(B1-N)	Neurotic-Stable	Emotional balance
(B2-S)	Self-sufficiency	Independentness
(B3-I)	Introversion-Extroversion	
(B4-D)	Dominance-Submission	
(F1-C)	Self-confidence	
(F2-S)	Sociability	Gregarious—vs.—solitary
Guilford-Martin "Personnel Inventory"		
(S)	Social Introv.—Extroversion	Sociable—vs.—shy
(T)	Thinking Introv.—Extroversion	
(R)	Rhathymia	Happiness
(D)	Depression	Optimistic—vs.—depressed
(C)	Cycloid	Stability of moods
(G)	General Activity	Activity—vs.—inertness
(A)	Ascendance—Submission	Dominance
(M)	Masculinity—Femininity	
(I)	Inferiority	Self-confidence—vs.—inferiority
(N)	Nervousness	Jumpiness
(O)	Objectivity	Objectiveness—vs.—hypersensitive
(C)	Co-operativeness	Tolerance
(A)	Agreeableness	Yes-Man—vs.—belligerency
Adams "Personal Audit"		
(I)	Seriousness—Impulsiveness	
(II)	Firmness—Indecision	
(III)	Tranquility—Irritability	
(IV)	Frankness—Evasion	
(V)	Stability—Instability	Self-confidence
(VI)	Tolerance—Intolerance	
(VII)	Steadiness—Emotionality	
(VIII)	Persistence—Fluctuation	
(IX)	Contentment—Worry	
Humm-Wadsworth "Temperament Schedule"		
(N)	Normal	Self-control
(H)	Hysteroid	Selfishness
(M)	Manic	Activity—vs.—inertness
(D)	Depressive	
(A)	Autistic	Shyness, introversion
(P)	Paranoid	Prejudices, stubbornness
(E)	Epileptoid	Project making, ecstasy
	No-count	reaction to test (not a "trait")
Washburne "Social Adjustment Inventory"		
(T)	Truthfulness	(primarily towards test)
(H)	Happiness	
(A)	Alienation	Common humanity
(S)	Sympathy	Warm heartedness
(P)	Purpose	Goal mindedness
(I)	Impulse Judgment	
(C)	Control	Self-control, persistence
Hathaway-McKinley "Minnesota Multiphasic Personality Inventory" (M.M.P.I.)		
(Hs)	Hypochondriasis	Health worries
(D)	Depression	
(Hy)	Hysteria	
(Pd)	Psychopathic Deviate	Unsocial, hostile, anti-social
(Mf)	Interest	Masculinity—Femininity
(Pa)	Paranoia	Prosecution complexes, delusions
(Pt)	Psychastenia	Compulsive behavior
(Sc)	Schizophrenia	Bizarreness, detached from reality
(Ma)	Hypomania	Activity level
(?)	Question marks	statistical measures of testee's understanding of and reactions to the test (not real "traits")
(L)	Lie	
(F)	Validity	
(K)	K-score	

TABLE No. 1 Trait titles used in nine well-known personality tests

Third: All personality tests will certainly attempt to inquire into the traits that are basically associated with the *feelings* that this person typically has.

Such rough sorting can, however, only be the beginning that gets us started toward a better understanding of what it is these traits and scales of personality tests are trying to measure. We may, perhaps, without much further explanation, understand what is meant by *level of activity*, but what about *attitudes* and *feelings*? People have lots of "attitudes", different attitudes toward different things. We may, therefore, have to extend our "attitude" category a bit by grouping the traits in such a way that they also will answer our question: "attitudes toward what?"

Likewise we must extend the category "traits associated with a person's feelings" to specify for us: "feelings about what?"

It may, perhaps, serve our understanding of personality tests best if we look at psychological traits as belonging to certain *families*:

Most personality tests employ traits basically associated with a person's:

GENERAL LEVEL OF ACTIVITY—
ATTITUDES
—attitudes toward LIFE
—attitudes toward INDIVIDUALS
—attitudes toward SOCIETY
FEELINGS
—CONTROL of feelings
—INTENSITY of feelings
—feelings of CONFIDENCE
—feelings of DEPRESSION
—feelings of BEING DIFFERENT
—feelings of HATRED

Table 2: Categories of traits used to describe and measure personality.

However, before we go any further into analyzing how the fifty-eight traits of Table 1 may be allocated to the trait families in Table 2, let us stop for a moment to recognize two important things: 1. *This is no attempt* to oversimplify what is complex, indeed 2. *This is an* attempt to understand in common language what personality tests are talking about.

Activity

The *General Level Of Activity* is probably the most self-explanatory group of traits. Is this person full of bounce, vigorous and always "on the go" — or is he slow-moving, slow-talking, physically lazy? Is he the type that loves to "step on the gas", always enthused about the volume of

business accomplished, without fussing too much about details, or is he characteristically meticulous, painstakingly systematic, carefully covering the area inch by inch?

Many of the traits that we find mentioned rather frequently in personality tests may well be grouped under this first heading. Actually nine of the fifty-eight traits in Table 1 may fit into this category. (For this and the following interpretations you may wish to refer to the set of "Summary Tables.")

Attitudes

For the attitudes group we said we needed the "toward what" details before we began to sort out our remaining forty-nine traits from Table 1.

A Person's Attitudes Toward life. By this the psychologist means a person's whole outlook on life: whether he is the kind to whom life is a game or whether he sees it as a drudge; whether life seems to have a purpose and destination, or whether he takes the attitude that all life, his own (or anyone's life for that matter) is merely a chain of so many events. Some people take the view that life is an art and a challenge, others that it is incomprehensible and beyond our own control. These beliefs will forever remain unproven and unresolved. They are viewpoints, attitudes. Sometimes they are real, sometimes imaginary products of experiences and learning.

Whatever their origin, they are the kind of thing that is meant by "attitudes toward life". The German language has a word for it that sometimes finds its way into the social conversations in our own country: "weltanschauung". A word that means somewhat more than outlook on life—it implies also the *actions* that stem from a particular attitude toward life. And it is actions or behavior that we want to describe, understand or predict with the help of these personality tests, isn't it? Therefore, a person's attitudes toward life represent a rather important group of personality traits.

Thirteen, or about 1/4, of the traits listed in Table 1 seem to belong to this group. (see "Summary Tables").

Attitudes Toward Individuals. How does a person usually approach a single other individual? Naturally this will depend on who and sometimes even on "what" the other individual is. Our attitude toward the boss may be quite different from our attitude toward a neighbor or casual acquaintance. Our

PERSONALITY TESTS — A SUMMARY OF TRAITS USED

Author or Test	Title of Trait	Author's Interpretations: High Degree	Low Degree or Converse
Thurstone	Active	on-the-go, hurrying restless	moves, works, speaks slowly
Thurstone	Vigorous	outdoor life, muscle energy	avoiding strenuous projects
Guilford	General Activity	Vigorous, overt action	disinclination for motor activity
Guilford	Nervousness	jumpy, jittery, distracted, irritated, annoyed	calm, unruffled, relaxed
Humm	Manic	on-the-go, alert, elated, driving, excitable, enthusiastic, talkative, distractable, quick-tempered, spark, impatient, restless, pressured for activity	little emotional reaction, indifferent, stoic, non-responsive
M.M.P.I.	Hypomania	ambitious plans, marked over-productivity, disregard for social conventions	
M.M.P.I.	Psychastenia	over-reaction, compulsive behavior, phobias	
Humm	Epileptoid	meticulous, painstakingly systematic, urges, violent activities, fainting, ectasy, inspirations, convulsions	patient, steadfast, ambitions, persistent interests
M.M.P.I.	Hysteria	exaggerations, conversion-type symptoms, faintings	

SUMMARY TABLE No. 1—Traits basically associated with a person's LEVEL OF ACTIVITY

PERSONALITY TESTS — A SUMMARY OF TRAITS USED

Author or Test	Title of Trait	Author's Interpretations: High Degree	Low Degree or Converse
Washburne	Happiness	contentment, life is worth while	
Thurstone	Impulsive	happy-go-lucky, carefree, quick spur-of-the-moment decisions	doggedly hanging on
Guilford	Rhathymia	happy-go-lucky, carefree, impulsive	inhibited, overcontrol of impulses
Washburne	Impulse judgment	favoring easier, immediate but lesser satisfactions for the greater but remote ones	planning for long range satisfactions
Adams	Indecision	momentary acceptance of influences, inability to make up one's mind	
	Firmness		positiveness, conscientiousness, factual, standing up for one's beliefs
Adams	Evasion	unwillingness to face reality, buck-passing, exaggerations, fantasy, unpredictable	
	Frankness		dependability, truthfulness
Adams	Fluctuation	bewilderment, uncertainty, immaturity	
	Persistence		stable attitudes, mature
M.M.P.I.	Hypochondriasis	health worried, immature, vague complaints, sympathy seeking	
Thurstone	Reflective	meditative, self-examining, alone	
Guilford	Thinking Introversion	meditative thinking, philosopher, analyzing one's self	
	Extroversion		lack of introspection
Adams	Seriousness	quiet, serious, ambitious, studious, specialized, stable interests, caution	
	Impulsiveness		need for pronounced sociability, fluctuating interests
Bernreuter	Self-sufficiency	preference for being alone, ignoring other's advice, independent	seeking advice, seeking support, need for encouragement
Washburne	Purpose	planning, goal directed, effort, evaluation	

SUMMARY TABLE No. 2—Traits basically associated with a person's ATTITUDES specifically: ATTITUDES toward LIFE

PERSONALITY TESTS — A SUMMARY OF TRAITS USED

Author or Test	Title of Trait	Author's Interpretations: High Degree	Low Degree or Converse
Washburne	Sympathy	positive responses towards people, emphatic	
Adams	Tolerance	easy-going, broad-minded, standards flexible, realistic, objective	
	Intolerance		fixed standards, strong (unfavorable) attitudes toward others, prejudices
Guilford	Co-operativeness	acceptance of others, acceptance of conditions, tolerance	overcritical of people
Guilford	Agreeableness	not quarrelsome, no domineering behavior	belligerent, overreadiness to fight
Adams	Tranquility	evenness of response, methodical, confident	
	Irritability		flying off the handle, impatient, annoyed, fault finding
Guilford Bernreuter	Ascendance (Dominance)	dominating others in face-to-face situations, social leadership, aggressiveness, power aims	
	Submission		submissive, social passiveness
Thurstone	Dominant	leadership ability or behavior, organizes, promotes, persuades	

SUMMARY TABLE No. 3—Traits basically associated with a person's ATTITUDES specifically: ATTITUDES toward PEOPLE as INDIVIDUALS

Author or Test	Title of Trait	Author's Interpretations: High Degree	Low Degree or Converse
Thurstone	Sociable	enjoying company of others, agreeable, co-operative	
Bernreuter	Sociability	sociable, gregarious	non-sociable, solitary
Guilford	Social Extroversion	sociability, seeking social contacts	
	Introversion		shyness, seclusive withdrawing from social situations
Humm	Hysteroid	self-preservation, selfishness, lacking consideration, anti-social tendencies, sharp trader, tricky crook, criminal	fair-playing, considerate, honest, generous, sacrificing, self-sacrificing, martyr-complex
M.M.P.I.	Psychopathic Deviate	absence of emotional response, inability to profit from experience, disregard of social mores, lying, stealing, addiction, immorality, anti-social deeds	

SUMMARY TABLE No. 4—Traits basically associated with a person's ATTITUDES specifically: ATTITUDES toward SOCIETY

society provides us with a host of situations in which we learned carefully to conceal our real attitudes. This conditioned approach, however, is not what is meant by "attitudes toward people as individuals". What the psychological traits of personality do mean by this, is more a characteristic pattern of the way we approach *any* other individual. Are we generally suspicious of the other person or is our response natural and positive? Are we generally considerate of the other fellow or do we spontaneously try "to get in the lead" over him? Do we generally approach another person cooperatively or belligerently? What is the "act" a person will put on when he meets another person, or how does he *react* to people as individuals?

Attitudes toward people as individuals account for eight of the traits of Table 1 (see "Summary Tables").

Finally, the trait family measuring attitudes will include a person's *Attitudes Toward Society*. By this we mean a person's actions and, perhaps, prejudices against this nebulous population called "people in general". Does he like to associate with groups? Will he be poised and comfortable, or will he be uneasy, perhaps full of contempt for "people"? Does he share our normal code of ethics and show attitudes of responsibility to the mores, folk ways and taboos of our society or does he behave eccentrically, essentially not bound to moral codes? Is he a hermit or, even worse, does he exhibit attitudes toward society that are deeply selfish, anti-social and hostile to all and everyone?

Five of the traits from Table I seem to be associated with this kind of an attitude (see "Summary Tables").

Feelings

We have found three main groups that might explain a host of traits concerned with *attitudes*. The family of "traits associated with a person's feelings" are by and large concerned with six more things. While none of the tests in Table 1 employ traits to measure *all* of these six categories simultaneously, nevertheless in combination they constitute the kind of thing personality tests are likely to talk about in one form or another.

Control Of Feelings. This category deals with the amount of self-control a person characteristically will exhibit, particularly in situations of stress. Whether a person is likely to remain relaxed and calm under considerable emotional stress (e.g., being severely criticised) or situational stress (e.g., a fire in the shop) or whether he is breakable or gets all excited, this would seem to be a rather important set of traits as far as a person's probable behavior in the business world is concerned.

Surprisingly, only three of the nine tests of Table 1 included this dimension in their traits. And, if we remind ourselves that we are concerned here with understanding what these tests are talking about, it seems interesting to note how this trait category is called by different names in each case: "stable", "control" and "normal" respectively (see "Summary Tables").

Intensity Of Feelings. If some personality tests attempt to describe how well feelings are *controlled*, then it is only logical to ask how much there is to control in the first place. How intense or volatile are this person's feelings likely to be? Will his emotional reactions be strong ones or is he characteristically cold, unmoved, "inert" or indifferent?

Into this category we have been able to fit four more of our fifty-eight traits from Table 1 which, incidentally, brings us up to forty-two trait titles thus far assigned to our "categories of understanding".

Feelings Of Self-Confidence. No one is "perfect" and rarely does anyone

feel that he is. Only occasionally do we meet the fellow who is so overtly satisfied with himself that it becomes disgusting. A certain amount of confidence in one's own abilities and values is essential for feeling secure in this competitive world. Therefore, any reasonable degree of self-confidence is looked upon by the personnel manager as a desirable attribute in a prospective employee. Cockiness, however, is not, nor is self-consciousness considered "desirable". Now, the things in life that make us at times feel self-conscious are frequently things beyond our control. It may be some real or imaginary flaws in our physical appearance, it may be a mere situation into which we get involuntarily. Imagine being called into the president's office after you've been with the company for four years without ever meeting the gentleman and it so happens that just this one day you came to work without a tie and jacket and didn't have time to shave! Such a situation would make any man mighty self-conscious!

Personality tests, however, are generally *not* talking about such situational and *temporary* feelings of self-consciousness. What this trait group attempts to measure is feelings of a much more permanent nature. Because we cannot control many of the things that are liable to make us self-conscious we have to *adjust* to them. Some people take such situations in stride. They feel that they *are* good and are confident that they still can and will get *better*. Others never get that feeling and are therefore not likely to exhibit the desirable behavior: namely trying to make up for whatever deficiency there might be. As a matter of fact such feelings of inferiority may often lead to a domineering, arrogant and supercilious behavior on the part of the self-conscious person. It is one of the more frequently met human defense mechanisms against nagging anxieties. The psychologists call it "reaction formation", meaning a behavior which is exactly opposite to the real but frustrated motives.

Surely, feelings of self-confidence or inferiority respectively are important traits to the personnel manager's business of selecting people. This may partially be the reason why the "Bernreuter Personality Inventory" and the Guilford-Martin "GAMIN" test have become the most popular ones in industrial psychological testing, as few of the other tests listed in Table 1 contain distinct scales for this trait. In the summary tables we allocated three more trait titles to this category.

SUMMARY TABLE No. 5—TRAITS basically associated with a person's FEELINGS

Author or Test	Title of Trait	Author's Interpretations: High Degree	Author's Interpretations: Low Degree or Converse
Thurstone	Stable	relaxed, even disposition, can remain calm, not fretting over chores	
Washburne	Control	self-control, self-regulation, planning ability	
Humm	Normal	self-control, balance, self-restraint, sanity, steadfast, over-control, dull, uninteresting, blocked for expressions	insufficient control, trouble inviting, breakable under stress, demonstratively unbalanced *extremely low degree:* completely demented, institutional case
	specifically:	INTENSITY and LEVEL of FEELINGS	
Bernreuter	Extroversion	rarely worrying, seldom emotionally upset	
	Introversion		living within one self, imaginative
Adams	Emotionality	sensitive, deepseated and volatile feelings, individualistic, creative, artistic	
	Steadiness		feelings not intensive, well adjusted
Bernreuter	Neurotic	emotionally unstable	
	Stable		well balanced emotionally
Guilford	Cycloid	strong emotional reactions, fluctuations in mood, instability	stable
	specifically:	FEELINGS of SELF-CONFIDENCE	
Bernreuter	Self-confidence	self-confident, well adjusted to environment	hamperingly self-conscious, feelings of inferiority
Adams	Stability	pronounced confidence in self, willingness for responsibility, boldness	
	Instability		feelings of inferiority, fear feelings
Guilford	Inferiority	underevaluation of one's abilities, feelings of inadequacy, feelings of inferiority	

Feelings Of Depression. Worries, gloomy moods and "the blues" are everybody's business. We can almost be sure that nobody is entirely free of such feelings, that is, once in a while. *This* is the key point of this trait group: does it only happen "once in a while" or are such feelings of uneasiness and poor morale characteristic of a certain person? We might off-hand think it's none of your business to inquire into a person's blues or to measure the degree to which he feels depressed. There are, however, very legitimate reasons for asking questions about these traits. Bad and prolonged feelings of uselessness and depression have the habit of fluctuating, perhaps spontaneously changing to feelings of elation and prowess. The actions of the chronically depressed person are hard to predict. His capacities for intelligent responsibility are hampered. Whimsical thoughts and decisions are just as likely to be made as they surely will be regretted later.

We find four tests in our Table 1 which include this particular trait category in their way of describing personality. Most of them using the words we have used here: *feelings of depression* (see "Summary Tables").

Feelings Of Being Different. Overstreet in his book "*The Mature Mind*"[12] has this to say:

> *"Matureness involves both a willing participation in the chores of life and a creative participation in the bettering of life . . . the individual has to learn to accept his human role. When an adult pettishly protests that he didn't ask to be born, he overlooks the simple fact that nobody else did either . . . To mature . . . is progressively to accept the fact that the human experience is a shared experience, the human predicament a shared predicament. A person remains immature, whatever his age, as long as he thinks of himself as an exception to the human race."*

[12] *H. A. Overstreet, "The Mature Mind", W. W. Norton & Company, New York, 1949, p. 51.*

SUMMARY TABLE No. 6—TRAITS basically associated with a person's FEELINGS specifically: FEELINGS OF DEPRESSION

Author or Test	Title of Trait	Author's Interpretations: High Degree	Low Degree or Converse
Adams	Worry	uneasiness, worry, conflicts, poor sex adjustment	
	Contentment		absence of worry, stable, well adjusted
Guilford	Depression	chronically depressed, feelings of unworthiness and guilt	cheerful, optimistic
Humm	Depressive	sensitivity to cares, worries, grouchiness, sadness, gloominess, 'the blues', feelings of uselessness, whimsical decisions, transitory moods, pitiful unconfident, melancholy, suicidal tendencies	cautious, self-sufficient, lack of emotional response, indifference, without feelings
M.M.P.I.	Depression	poor morale of emotional type, feelings of uselessness, worry, neurotic	
	specifically: FEELINGS OF BEING DIFFERENT		
Washburne	Alienation		sense of social acceptance, sense of basic common humanity, psychological security
Guilford	Masculinity	masculinity of emotional and temperamental make-up	
	Femininity		femininity of emotional and temperamental make-up
M.M.P.I.	Interest	non-normal sex-bound interests sexual inverts, overt or repressed homosexuality	
Humm	Autistic	rich imagination, artistic, idealistic, daydreaming (autistic), shy, retiring, sensitive, queer, unusual mannerisms, passively stubborn, poor mixer	lack of vivid imagination, unable to deal in the abstract, unable to foresee outcome of one's actions
M.M.P.I.	Schizophrenia	bizarre thoughts and behavior, splitting of subjective life from reality, non-rational, shifts in moods and behavior, perplex motor behavior	

PERSONALITY TESTS — A SUMMARY OF TRAITS USED

Author or Test	Title of Trait	Author's Interpretations: High Degree	Low Degree or Converse
Guilford	Objectivity	dispassionate view of one's self and surroundings	hypersensitive, taking things personally
Humm	Paranoid	aggressive, opinionated, prejudiced, fixed ideas, bitterness, quarrelsome, revengefulness, delusions, prosecution complex	easily influenced, insufficient confidence in own ideas, easily swayed, leaning on others for decisions
M.M.P.I.	Paranoia	suspiciousness, oversensitivity, delusions of prosecution, egotism, tendencies to vengeful actions	

SUMMARY TABLE No. 7—Traits basically associated with a person's FEELINGS specifically: FEELINGS OF HATRED

All right, the individual *is unique*. If it were otherwise we wouldn't talk about personality nor would we have personality tests. If we, however, feel that the process by which we became the unique individual we are, or the problems that we have in "being ourselves" are entirely different from those the rest of society has to cope with, then we are deceiving ourselves. People who do feel that way also frequently feel that they are not understood by the "bulk of the people around them". The word "bulk" would be just typical for the thoughts of such individuals. More often than not the person who feels he is "different" will have not much more than contempt for "these other people".

That strong feelings of being "different" will not be conducive to cooperation, team work or psychological security seems highly possible. Therefore, the personnel manager will be interested to know whether a certain test will provide insight into this particular trait. Basically he would like to know whether his employee shares feelings of social membership and common humanity.

He probably *is* interested in such statements. However, he may *not* be so interested in many of the ramifications that this particular trait category often attempts to measure: namely the larger deviations from the normal continuum of feelings of difference, deviations that really fall in the realm of clinical psychology. Tendencies toward homosexuality and schizophrenia *could* be interpretations from the extreme ends of these scales. Such cases are rare in industrial work. It might be helpful, therefore, to recognize that in this particular trait group (which we called "feelings of being different") we sometimes find scales that are much more appropriate for *clinical* than for *industrial* measurement of personality (see "Summary Tables").

Feelings Of Hatred. How belligerent, suspicious and revengeful can a person be? What is meant by this trait is not so much how he might behave after being teased, nagged and irritated beyond anybody's capacity of good-naturedness. Rather, the trait family aims at describing deep seated feelings of the "everybody-is-against-me" routine. Will this person take bona-fide disagreements objectively and in a detached manner or will he take such things personally? High sensitivity toward situations like this tends to build up feelings of bitterness and aggression. But, as aggressional behavior is generally disapproved of in our society, we have learned to swallow our aggressional urges rather than punching the other fellow in the nose. This, in turn creates more frustration. By an age-old psychological process wherein frustration creates aggression and aggression creates *more* frustration, one may finally derive deep seated feelings of revenge and hatred against all and everyone.

Persons who do not successfully adjust to this sensitivity, who at all times take everything as a personal offense, are not only unhappy human beings but also highly undependable, if not outright dangerous. Some of our personality tests do speak about this trait. As we may see from the "Summary Tables", the trait descriptions will again occasionally go all the way into the symptoms of clinical abnormality (persecution complexes and the like). Interpretations of such high degrees of hatred are difficult to make and even more difficult to do anything

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about. Let's face it: while he is the nightmare of every personnel manager, not *every* employee who has a grievance is a paranoid!

This, Mr. Personnel Manager, is what personality tests are talking about: *General Level of Activity*, some *Attitudes* and half a dozen *Feelings* which you and I and some of our employees may hold.

This is *all* they are talking about! Personality tests will *not tell you what a good executive or a good foreman looks like*, personality-wise. While some test authors are looking for distinct patterns of personality that discriminate presidents from accountants, accountants from salesmen and salesmen from teachers,[13] others are warning against the futility of such attempts,[14] while still others are attempting to establish the typical-for-our-company-executive profile.[15] [16] All these attempts are *uses* to which trait descriptions of personality are being put in order to find aids to managerial decisions. These are *techniques* which are just as often loudly challenged as they are individually praised. The usefulness of such techniques is a matter of opinion, managerial beliefs, or "attitudes and feelings", if you wish. Whatever they are, they are *not* a part of the psychological theory that attempts to describe personality by traits.

What personality tests, in fact, are saying to you is this:

> If you know what you are looking for, we will help you to describe "it" so that others, too, can look for the same thing. We will also help you to know when you have found "it". What you then *do with "it"* is for *You* to *THINK* about, because this is one thing that we cannot do for you, Mr. Personnel Manager! ■

[13] *A. V. Clarke, "The Construction of an Industrial Selection Personality Test", Journal of Psychology*, 1956, 41:384-5.

[14] *D. G. Humm, "The Humm-Wadsworth Temperament Measures", Private Service Bulletin, D. G. and K. A. Humm, Los Angeles, California.*

[15] *V. J. Bentz, Sears, Roebuck and Company, "The Sales Executive Battery of Psychological Tests".*

[16] *W. H. Whyte, op. cit., pp.* 204-206.

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RALPH N. TRAXLER, Jr., was assistant training manager for Kraft Foods Company, Chief of training for the U. S. Air Force Procurement Program and an Assistant Professor at Emory and Henry College before going to the University of Florida as Assistant Professor of Management. During the war years (1943-46) he served with the U. S. Navy. Professor Traxler is Faculty Sponsor for the Society for Advancement of Management at the Florida university.

Imagination—Catalyst Of Management

by Ralph N. Traxler, Jr.
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NOT TOO long ago success was invariably attributed to ninety-nine per cent perspiration and one per cent inspiration. Today this has become a working dogma for many professional managers of business, big or small. But this glibly stated formula greatly oversimplifies what really makes a successful manager. There is no one thing, no "sure fire" road to success in the management job. The formula for success is complicated; it has few constants and many variables. A little understanding of some of the variables may give the average supervisor clues to seek out the answers to his own people-centered problems.

When a business executive was recently asked what he considered the best qualification for getting ahead in his work, he answered, "Imagination". The imagination he spoke of is at least a first cousin to inspiration. Now this does not mean that hard work is passé. Creative thinking *is* hard work. The man plodding along at five days per week of eight hours each is not assured of someday getting to be the "big boss". Nor will six days of ten hours each help his cause more. He rather needs to use and develop his mental skills, to apply these skills to finding new ways and means to do his job better and faster—in other words, more economically and more efficiently. But new ideas come neither easily nor without considerable mental—and sometimes physical—effort.

There seems to be strong evidence that management men and those who aspire to manage can be *helped* to the business maturity of imaginative and creative thinking and doing. But since management is defined as getting a job done through people, this indicates that the key to management success is with the work force. Therefore, a big part of success in management means applying successfully the variables that develop the imagination of the people who carry the work load of the organization. It does not seem unfair to label this imagination as the catalyst of good business management. But the question of practicality to the supervisor must be considered. And that question is, "How can I develop this catalyst in myself and my people?" It's true we are all born with various degrees of creativity and imagination. But the good catalyst does not just happen. It is created under carefully controlled conditions. To reach its full strength as a successful catalyst, the imagination must be developed with controls that prevent the variables from doing inestimable harm. It is the responsibility of the manager to set up controlled conditions that get the best results from his people, and in himself. These controlled conditions are at least three in number.

First, since imagination has to be expressed to be of use, the supervisor must help his people and himself become better communicators. Second, the supervisor can by getting to know his people and carefully training them shape his work force into a more independent unit. This helps free himself from the need of constant surveillance. Independence also nurtures imaginative thinking. And third, the supervisor can plan a program of self-development for himself and his assistants. This type of counseling leads to new interests, literally to new horizons. And new experiences are often the incubator for the imagination and the happy home of creativity.

Developing Communicative Ability

The imagination cannot function properly without being able to express itself. This means the ability to communicate, orally and in writing. Most management men have a basic ability to communicate and by practice have improved their ability. That is one reason they are managers. Those who find themselves by circumstance in management jobs realize quickly the need to express themselves. This becomes doubly true when the manager knows he has to do more than get the work out. For instance, he is expected to come up with new and better ways to do the job, faster and easier and with less expense. He needs

therefore to make clear his ideas to the work unit. But he must also depend on his specially trained assistants for new ideas and new ways to do things. Therefore, they too must have help in becoming better communicators.

We have all heard supervisors complain, "He's a good man, *BUT* . . ." The "but" usually goes something like this: "Yes, Joe's a good man but he can't get his ideas across. He's especially poor on paper. What can I do to make him more expressive?" Probably the whole point of this particular problem is the necessity for the *supervisor* to do something. When this is posed to the average manager his answer is "what?". Some time-tested management experience gives us at least a partial answer. Part of the solution is giving more work-day time to guiding his people. Too many supervisors find it faster and easier to complain about poor communication ability than to do the obvious thing: sit down with the man and help him. This means showing the man why his ideas are not clear and how to make them clearer. It involves taking his written material and analyzing it carefully *with* him, not just *for* him. Imagination can be pricked by showing the man how to organize his ideas in outline on paper *before* he starts to express himself in writing. This helps develop clear thinking, and clear thinking in most cases is the solid foundation of imaginative and creative doing. The employee should be asked to write and rewrite until he has perfected his written skill. Short sentences clearly written require hard work and long practice, but they are the focal point of real creativity. A supervisor who spends time passing on the tool of good communication is spending time to develop the ability to express the imagination he needs in his people and in himself.

A SUPERVISOR of my acquaintance mentioned a "good man" who had trouble expressing himself orally. He was unable to make an idea clear. The supervisor in working with the man did not create a feeling of frustration and fear. But by careful guidance he interested the man in the local Toastmasters' Club. Already notable improvement has been evidenced. It might be interesting to follow the progress of such an employee as he learns to talk about his ideas. What is happening, of course, is that he is better able to communicate what he knows. Therefore, he seems to be gaining in creativity. In reality the creativity was always there. But now it's getting a chance to come out in the open. The supervisor is also shaping his own creative ability because, like the good teacher, he is probably learning as much as his pupil.

Most failures in building better communications usually occur because of the inability of the supervisor to recognize the problem. Recognition is a good step along the way but the real test is what he *does*. The doing necessitates many hours spent working with the people who need the help, hours of guidance and constructive criticism. Only practice can mold communication skills. Therefore, the manager should take advantage of every opportunity to develop his own ability. And the manager should make an effort to give his people more practice by giving them more opportunity to express their ideas. Supervisors have been heard to say that it is more work to re-do the job than to do it themselves. What they are really saying is that it is hard work to guide and counsel and that they are afraid to let a man go on his own. This is the supervisor's biggest challenge and leads to the second idea for developing imaginative creativity.

Independence Nurtures Imagination

Most supervisors have been faced with the need of letting a man go out on his own. The sales manager has to release his men into the field. The production foreman can not watch every move of every employee. The business executive learns to trust his subordinate managers to do their jobs without requiring detailed and minute reports. Imaginative thinking can be stimulated when a person is given a little independence. Freedom then becomes a challenge to do better—not a chance to loaf. It becomes the fertile soil of personal effectiveness on the job. Most managers admit the logic of this but want to know the answer to two questions: How do I know when a man is ready for independence? What can I do to get him ready?

Unfortunately there is no easy formula for recognizing *when* a person is ready for independence. It is like trying to say when a baby should walk. But like the toddler taking his first steps, so too should the average employee be given independence. It should not come all at once but slowly and a little at a time. This helps build confidence because the person tastes success. He is not thrown into a situation where failure is certain. With confidence bolstered by success the man becomes ready for independence. And with this gradual growth comes the firm foundation of creativity. A good supervisor needs no yard stick for measuring when a man is ready. He is everyday finding new competence in his people and thereby releasing them more and more from a status of constant surveillance. As the supervisor has to supervise less and less he frees himself for more creative jobs. His imagination finds time to work without being crowded with the continual burden of *detailed* supervision.

HERE are a few time-tested ways the supervisor can help develop employees' independence: Employees should know how to do all aspects of their jobs. Many people have been doing work for months—sometimes even years—without knowing or understanding all they should about their work. The supervisor should take time to tell and show them how. Later he must have them demonstrate their competence. Occasional checks on their progress will suffice until the manager is confident of the ability of his people. Simply then, there should be a good training program. But training programs do not spring up full grown. They necessitate identifying needs, setting up plans and putting the plans into effect. This takes time and supervisory effort. Many supervisors prefer to let training drift and do nothing. Training does not have to be formal to get results. What does count is that personally supervised instruction is given to each employed person.

People who are showing signs of technical progress can be given working independence. Many supervisors have found it pays to allow employees to work on a project in the capacity of an associate rather than as an employee. This frees them from the rigidity of the employee-employer stigma. It stimulates them to come up with new constructive ideas, to put to work their creativity.

Independence also comes through trust and confidence. No one truly gains independence until he knows he is trusted. This is true of the young child, the soldier, the business employee, the executive—in fact, everyone in every station of society—in every type of job and endeavor. This means that the supervisor must get to know his people better. He must get to know their hopes, fears, likes, dislikes, special interests, even their frustrations. It means getting to know about their families, their friends, their troubles, their needs. A new rapport is established, a rapport which

builds confidence in the job as more than just a place to work—confidence that leads to a new sense of freedom and achievement. The average employee can be stimulated to do a good job because he is innately honest. He wants to give value for value received. With this positive approach to working with people the good manager develops a new imagination in his people. Imagination grows fastest in the surrounding of good faith and confidence in management's good sense.

The supervisor also benefits by a competent working group. His own imagination is often pricked by a germ of an idea dropped by a cooperative employee —an employee who feels free to talk because he knows he will be heard in fairness and not ridiculed or embarrassed by an egocentric boss. Imagination is created by independence and self-confidence. But it must be given a friendly atmosphere in which to grow and mature.

Self-Development Incubates Creativity

Even if the manager has helped develop the communicative skills of his people and given them a feeling of self-confidence and importance through independence, his job is not completed. He must also help stimulate creativity by guiding people toward more effective self-development and taking an active interest in his own self-improvement. This is a matter of careful guidance and counseling. The supervisor should become thoroughly familiar with the strength and weakness of his people. This will give him some valuable hints as to what their professional and technical needs may be. Self-development can be aided in several ways. No one is in itself a solution but may help the conscientious manager find the right answer tailored to the needs of each individual.

The supervisor can guide his people into special courses and institute-type training programs. Some companies pay for these or help meet tuition expenses. Such courses bring the employees in contact with new ideas and, more important, with new people. The new thinking gained from a group of employees in other organizations is stimulating to any normally intelligent mind. Where special courses are not available or impracticable, books and magazines are of value. Every company should subscribe to periodicals that will help employees keep up to date on information relative to their jobs. Most people find this material worth examining regularly if they are properly guided by the bosses.

Both special courses and independent studies are worth considering as stimuli to the imagination. Neither method is intended to be used in such a way as to make the employee self-conscious or to develop a feeling of inadequacy. Neither method should be used for any reason than to assist people to become better informed, more intelligent workers. Neither method can be successful without careful guidance from the supervisor.

In carefully conrolled situations, employees can be used to help instruct and guide others. Caution must be used that the people in the work unit do not become confused as to who is in charge. This can lead to many troubles in any work group. The supervisor can by proper guidance and preparation of his people prepare the way for giving an exceptional person a chance to try his wings. It enables the employee to test technical abilities as a supervisor under controlled conditions. It stimulates his thinking machinery. It challenges him to do a more responsible job for the benefit of the whole group and himself. It gives a feeling of accomplishment and channels the employee into new areas of investigation. Supervisors who have tried this type of experiment have been pleasantly surprised with the results, and the supervisor himself has been rewarded by more effective workers. The effectiveness of the right kind of "know how" leads to more creative forcible thinking from everyone concerned.

The supervisor who gains the confidence of his group can use employee suggestions to everyone's satisfaction. People often feel that a new idea may not be welcome. This is especially true if there is a feeling that the boss resents his people getting "too smart". The stimulation of a proper suggestion system again depends on careful guidance and preparation. It should be a natural everyday kind of occurrence. Above all it should never stress the immediacy of reward. Rather it should be part of the over-all development of a high quality working group. In this way everyone benefits. And its effect on creativity is amazing. This was found true in the Scanlon Plan. Joseph Scanlon, Professor of Industrial Relations at M. I. T., experimented successfully in a non-reward suggestion system as part of a new approach to employer-employee relations. The incentive was the increased over-all efficiency of the work unit. Everyone benefited, not just a few. And this system added many creative ideas. Mr. Scanlon found a workable system of stimulating the imagination of the worker *and* management.

Self-development means hard work and sacrifice of employee and supervisory time. The effort expended may not show immediate results. However, no group of employees or their supervisor can attain a maximum potential of imaginative and creative ability without expanding their "know-how". New ideas, greater efficiency, easier ways of doing things come from pooled knowledge. The most imaginative people are often well informed individuals who take an idea or technique and apply it intelligently to the needs of their own job. Just like the tailor-made suit, a tailor-made idea fits better. Imagination *can* be stimulated by new knowledge and by the desire to learn what other people are doing.

Summary and Conclusions

Creative imagination means a better work force. The supervisor at every level is responsible for developing this high degree of imaginative creativity. He can do this by working *with* his people. This does not mean doing their job but guiding and counseling them to help them increase their abilities. In turn the supervisor profits himself. As he works with people his own imagination is stimulated. As his work force learns to use their imagination, his own time becomes freer. As he learns to have confidence in his people, his work unit improves and he becomes, in toto, a better manager. These things all give him a chance to put more creative time into his own work.

Three techniques have helped many supervisors develop imaginative creativity in their people and themselves. These are:

1. Developing communicative ability in employees and themselves.
2. Stimulating independence by such techniques as training.
3. Planning programs of self-development.

Naturally these techniques are not a complete answer to the management problem. However, by tailoring these three techniques to the needs of each individual, employee imagination can be stimulated. Imagination can truly become the catalyst of creative thinking and doing. ■

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Comptroller Versus Controller

By Geoffrey H. Kimpton

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THE advancement of any profession is encouraged by having its field clearly defined. This definition should be comprehensive for those intimately concerned. It should also be clear and concise for those who only work with or make use of its benefits.

The title of the top job in a profession represents the extreme of conciseness in defining its activities, but the clarity and general acceptance of its meaning should also be considered. This should be borne in mind in deciding between the use of "Comptroller" or "Controller". In other words the title should convey to those inside and outside the profession the ultimate purpose of the position in a Company.

For those inside the profession the purpose of the position has been and is being continually reviewed and discussed. Associations and literature on the position and on its functions have enhanced their importance and strengthened them to become one of the newer professions in the business world. Calling it a "Comptroller" or "Controller" is not of too great significance to them for they understand fully the intended field of its operations.

What of those outside the field of its operations? Is the choice of the title "Comptroller" or "Controller" as insignificant to them? Should their opinion be considered?

Consider some of these outside opinions such as the General Manager or his equivalent, the Chief Engineer, the General Sales Manager, the chief Purchasing Agent, the Production Manager, the Industrial Engineer, the Board of Directors, the Shareholder, and the general public.

The General Manager or his equivalent knows he is administrative head of the Company. His main job is the making of decisions. These decisions are based on his experience and on the information he can accumulate principally through his senior subordinates. In effect he, as General Manager, exercises the controls which result in the success, mediocrity, or failure of the Company. He then is actually the "Controller" who makes use of the "Comptroller's" recommendations as well as those of other subordinates.

The Chief Engineer is concerned with many controls in the execution of his duties. Quality Control, Production Control, Engineering Control, etc., with a supervisor of controls in charge of each. His preference for a suitable descriptive title would be "Comptroller" by a long shot over "Controller". The word "Controller" suggests to him something quite different from that intended by the "insiders".

The General Sales Manager is intensely interested in a practical means of effecting control over the sales effort of his group. Sales Control, Expense Control, Manpower Control, etc., have little to do with the title "Controller". Is the word "Control" wrongly used by the Sales group or perhaps is the word "Comptroller" more descriptive in defining the duties of the "accounting boys".

Upper and lower control limits for purchasing are a great help to the Chief Purchasing Agent. Controls for operating his department are established fairly independent of the accounting and related groups although his performance may be measured by them. This again suggests the use of "Comptroller" in preference to "Controller".

Production Control is probably one of the most important guides for the Production Manager. It has little to do with the activities of the "Comptroller" or "Controller". The same is true of controls for manpower, equipment, material, etc. Use of the word "Controller" is a misnomer according to the Production Manager. He likes the word "Comptroller" which means Controller of Accounts.

The Industrial Engineer influences controls considerably in his job. His main activity is the establishment of controls and standards. Why should another type of work have priority on the word "Controller".

Many Boards of Directors lean heavily on their appointed President and General Manager for exercising control and corrective measures. They generally accept without too much thought the title "Controller" or "Comptroller". They know the one responsible for all controls and results is the President and/or the General Manager. Would not the profession benefit more by using the word "Comptroller"? This would result in a clearer understanding by the Board of Directors of the advantages to be gained through full use of the Comptroller's functions.

The same reason is followed in connotations arrived at by the shareholders and general public. Here the selection of appropriate title is most important. Both groups have a limited understanding on the division of business functions and the titles of company executives. The interpretation is often quite literal. The General Manager manages the enterprise, the Chief Engineer is the senior technical man, the General Sales Manager is the senior salesman, etc. If this process is followed then the "Controller" is the man who actually controls the enterprise. The "Comptroller" suggests one who is in charge of or controls items related to accounts and their optimum use for the benefit of the Company.

Considerable work has been and is being done to promote the field of comptrollership or controllership. Let us be sure the title of its highest representative is clear, concise, and acceptable to all. ■

New Management Writing . . .

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by Max K. Adler. Published by Philosophical Library, New York. 158 pages; $4.75.

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L. T. White
Director & Manager
Business Research & Education Dept.
Cities Service Petroleum, Inc.

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Harold Engstrom
National Industrial Conference Board
New York

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